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Intermittency in Growth as an Index of Health Status

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CHILDREN in the public schools are commonly weighed each month to observe growth, but their weights are no longer compared with height-weight averages to determine which children are "underweight." The present procedure is based upon studies[1,2] which have shown the limitations of underweight as a health index, and upon experience which shows that the child's interest in watching his growth is a motivating factor in the development of health habits.

It is a recognized fact that growth among healthy children is a reasonably continuous process. What is the significance of intermittency?

We have sought to determine the answers to the following questions:

1. To what extent does intermittency occur among school children in the first 6 grades?
2. Is intermittency in growth usually associated with unhygienic living, physical defects or illness?
3. Can intermittency be used as a method of screening out public school children who need special attention?

Children in 6 of the elementary schools of Malden, Mass., were weighed once a month on the same day each month and at the same time of day, with shoes on, by the classroom teacher. A classroom weight record was kept of each monthly weighing.

In order to determine the amount of intermittency, we examined the records of 971 children, 6 to 12 years (see Figure I). For the school year 1929–1930 we found that 16 children, or 1.7 per cent of

FORM USED—INDIVIDUAL HEALTH CONFERENCE (1930)

1. Name
2. Grade ..... School ..... Teacher .....
3. Age
4. Last Height
5. Weights
6. Average Weights
7. Physical Record from Classroom Physical Record Card
   - A. Defects recorded by doctor
   - B. Corrected ..... Date .....
   - C. Uncorrected
8. Illness during last 3 months
   - A. Nature
   - B. Time and duration
   - C. Absence from school
   - D. Medical care during illness
9. Teacher's Remarks
   - A. Frequency of absence
   - B. Nervous condition
   - C. Type of home environment
   - D. Interest and ability in work
10. Health Habits (Record of last 24 hours)
    - A. Intake and Elimination
      1. Number glasses of milk at home ..... school .....
      2. Breakfast
      3. Lunch
      4. Dinner
      5. Candy
      6. Food between meals
      7. Amount of water
      8. Bowel movement
    - B. Rest Habits
      1. Bed time
      2. Rising time
      3. Time between supper and bedtime
      4. Activity before bedtime
      5. Number sharing room
      6. Number sharing bed
      7. Windows open
      8. Rest periods during day
    - C. Outside Activities
      1. After school
      2. Outdoor play
      3. Outside lessons
      4. Outside work
      5. Saturday and Sunday recreation
11. Additional Remarks
    - Number in family
    - Mother living
    - Father living
    - Father working
    - Any other members of family working

the group, had gained weight each month; 42.1 per cent of the group failed to gain in one or more monthly periods but never failed to gain over a 2-month period; 36.6 per cent failed to gain over one or more 2-month periods but never failed to gain over a 3-month period; 15.4 per cent failed to gain for a 3-month period but never for a 4-month

period; 3.3 per cent failed to gain for a 4-month period but never for a 5-month period; 0.9 per cent of the group failed to gain for 5 months in succession. Figure II shows that the distribution of intermittency for the different ages is approximately the same.

During the last half of the school year 1929–1930 we gathered additional data concerning 95 children (Group I) who had failed to gain for a period of 3 months within the school year. (Eight children in this group gained ¼ pound during the 3 months in question, the others showed no gain or loss.) In September, 1930, we gathered similar data concerning a control group of 100 children in the same schools (Group II) who had gained regularly, that is, children who had never failed to gain over a 2-month period during the preceding school year. Four of these children had shown a gain each month and none had failed to register a monthly gain more than twice.

The present study compares the children who failed to gain over a 3-month interval with those who gained regularly. The information concerning these children was secured from the physical record cards of the school system, and by means of a physical examination to which parents were invited. The scholastic ability of the child was rated by the teacher. At the same time an individual health habit conference took place between a health education worker and the child, and the child's program for the previous 24 hours was reviewed as an index of his health behavior. The nature of the data collected at these conferences may be seen from the form used.

Table I shows some interesting data regarding the nature of these children.

TABLE I

NATURE OF GROUPS STUDIED

	Group I	Group II
Number of children	95	100
Children of good mental ability	52	55
Children of fair mental ability	23	26
Children of poor mental ability	20	18
Large family (5 or more)	51	59
Families with more than one wage earner	4	12
Children whose mothers work	14	10
Fathers out of work	5	6
Fathers not living	5	4
Mothers not living	2	3
Children working outside daily	7	5
Children working outside one day or more weekly	12	6
Children taking some outside lessons	26	29
Parents present at physical examination	56	56

The distribution of good, fair and poor students was practically identical in the two groups. There was no appreciable difference in the number of parents who attended the physical examinations, in the

FIGURE I

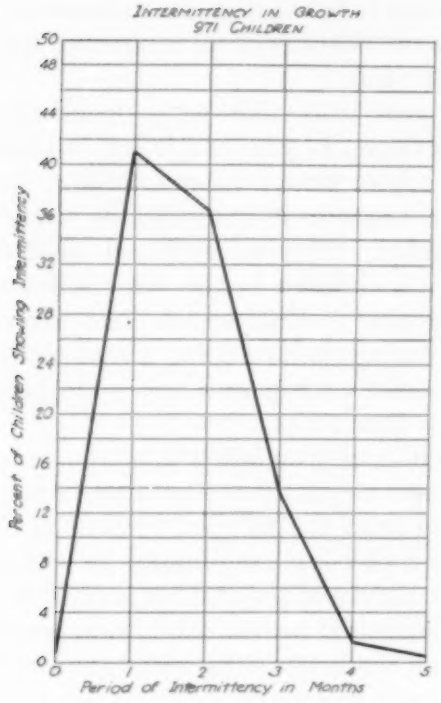
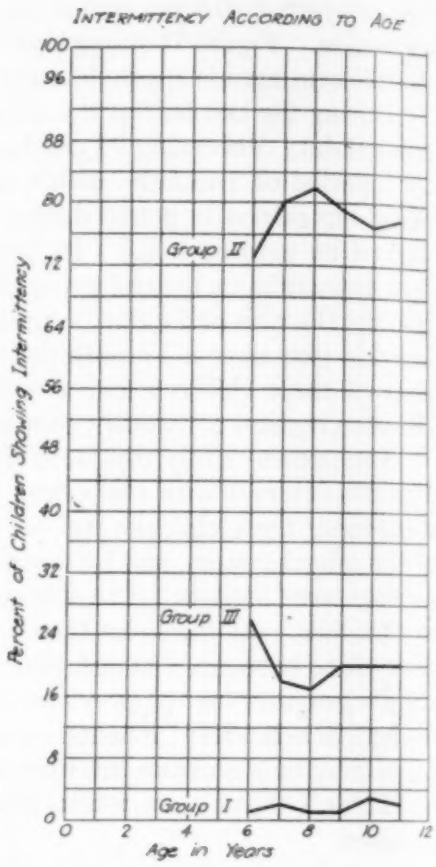


FIGURE II



Group I - No Intermittency (13 Children).
Group II - 1 Mo. or 2 Mo. Intermittency (740 Children).
Group III - 3 Mo. or Longer Intermittency (187 Children).

number of children taking lessons of some sort outside of school, in the number of children coming from large families, or in the number of children whose father or mother was not living. There is some suggestion that the children in the consistently gaining group were in somewhat better economic situations because in more cases there was a second wage earner in the family, in slightly fewer cases were the mothers gainfully employed outside the home, and in somewhat fewer cases were the children regularly and gainfully employed outside of school. In short, these two groups of children taken from the same schools seem alike in mental ability, in general home and social conditions, and not greatly different in economic status.

Since the children studied were drawn from a rather wide age group, Table II is inserted to show the distribution according to age.

In gathering information concerning the habits of the children during a 24-hour period, care was taken to avoid any embarrassment on the part of the child in stating frankly what had taken place. Pupils

TABLE II

AGE DISTRIBUTION AT BEGINNING OF PERIOD OF STUDY

Age	Group I	Group II
6	13	15
7	24	17
8	14	16
9	11	22
10	14	16
11	10	8
12	7	6
13	2	0
	95	100

can remember what they did during 24 hours preceding the conference, and experience has shown that much more accurate data can be obtained in this way than by inquiring what they "usually do." See Table III.

It will be seen that faulty health behavior was much more common in the children who had failed to gain over a 3-month period. In comparing breakfasts we find that Group I showed twice as many children who failed to have milk. The difference in the numbers of children having cereal or bread is probably not significant since one is often a

TABLE III

A COMPARISON OF HABITS BASED ON THE STUDY OF A 24-HOUR PERIOD

	Group I	Group II
Number of children in group	95	100
Having for breakfast—		
No cereal (egg allowed as substitute)	20	27
No milk or cocoa	32	14
No toast or bread substitute	20	13
No fruit	65	71
Having no meat, fish or egg protein	27	12
Having less than 3 glasses of milk *	51	34
Having no vegetables besides potato	47	34
Having no fruit	52	34
Having tea or coffee	6	5
Having inadequate sleep	31	20
Having less than 4 glasses of water	38	50
Having no bowel movement	4	4
Having no outdoor exercise	7	6
Having windows closed at night †	15	3
Having no fruits or vegetables besides potato	29	14
Having less than 3 glasses of milk and no meat, fish or egg	13	5
Having inadequate liquid (less than 4 glasses of water and less than 3 glasses of milk)	21	17
Having inadequate milk and no fruit or vegetable	21	6
Having no cereal or bread for breakfast	3	4
* Of this group those who had no milk or cocoa for breakfast were	28	11

† These figures are not comparable because the data for Group I were taken in the winter and those for Group II in September.

substitute for the other, and since we find only 3 in Group I and 4 in Group II who did not have either cereal or bread. There is only a slight difference in the number of children who failed to have fruit for breakfast, but 52 in Group I failed to have any fruit during the day, while only 34 in Group II reported such failure. Group I had 17 more children than Group II who received less than 3 glasses of milk, and 15 more who had no source of protein except milk.

When we look up the number of children who had less than 3 glasses of milk and no other protein, we find 13 in Group I and 5 in Group II. We find 29 in Group I who had neither fruit nor vegetables besides potato, but only 14 in Group II. There was no significant difference in the number of children who had tea or coffee, the number who failed to have a bowel movement, or the number who failed to play out of doors. Nearly all in both groups had a satisfactory record in these respects.

Appreciably more of the children who had failed to gain showed inadequate hours of sleep. (Inadequate sleep was based on the following standard: 11½ hours at ages 6 and 7, 11 hours at ages 8 and 9, 10½ hours at ages 10 and 11, 10 hours at ages 12 and 13.)

The question of liquid intake is somewhat confused by the fact that some children may substitute milk for water at certain times of the day. In order to determine the number of children having inadequate liquid, therefore, we determined the number who had less than 4 glasses of water and less than 3 glasses of milk, finding 21 in Group I, and 17 in Group II.

In order to secure some index of the number of children having low vitamin intake, we checked those having less than 3 glasses of milk and no fruit or vegetable during the day. There were 21 in Group I and 6 in Group II.

In order to get data on the more serious faults let us compare the children with respect to 5 items of behavior: (1) inadequate protein (less than 3 glasses of milk and no meat, fish or eggs), (2) low vitamin intake (less than 3 glasses of milk and no fruit or vegetables), (3) inadequate sleep, (4) inadequate liquid (having less than 4 glasses of water and less than 3 glasses of milk), and (5) deficient roughage (having neither fruit nor vegetable besides potato). Table IV shows the number in each group deficient in none, 1, 2, 3, 4 or all 5 of these. The number of children in Group I whose health practices were at fault with respect to 2 or more items is 33 as compared with 12 in Group II. The reader may be struck by the fact that 33 of the children who had failed to gain were at fault in none of these particulars. Most of these were suffering from recent illness or from physical defects.

Of course these data do not pretend to present a complete, accurate, and adequate picture of health behavior in the two groups; but they do show a significant difference.

TABLE IV

NUMBER OF CHILDREN HAVING INADEQUATE PROTEIN, VITAMINS, SLEEP, LIQUID OR ROUGHAGE

No. Items Wrong	Children in Group I	Children in Group II
0	33	54
1	29	34
2	18	8
3	8	4
4	5	0
5	2	0
Total	95	100

Table V compares the two groups of children with respect to the number of physical defects sufficiently serious, in the judgment of the examining physician, to require correction or treatment.

TABLE V

PHYSICAL DEFECTS REQUIRING CORRECTION

	Group I	Group II
Number of children	95	100
Enlarged cervical glands	2	0
Posture (drooping)	8	1
Nutrition	4	2
Teeth	49*	48*
Feet	1	1
Tonsils	12	6
Tonsils (corrected)	45*	60*
Scalp	1	0
Sight	0	2
Eyes (not vision)	1	0
Hearing	5	1
Ears (not hearing)	3	2
Skin	4	1
Heart	1	0
Lungs (dullness)	2	0
	44	16

* Items not included in totals.

It will be seen that there were nearly 3 times as many physical defects in Group I as in Group II. A few items are especially worthy of note. The only defect more common in Group II than in Group I was vision. On the other hand, defects of the lungs, heart, and cervical glands occurred only in Group I, and defects of hearing, skin, tonsils, posture and nutrition were relatively more common among these children whose growth record was poor. The number of cases of seriously defective nutrition was small. The basis of this diagnosis was the judgment of the physician using many indexes, including particularly

the condition of the subcutaneous tissue. If the fallacious practice of diagnosing malnutrition upon the basis of 10 per cent underweight had been followed, we should have recorded approximately 40 such children. It is interesting that appreciably more children in Group II had had corrective treatment for diseased tonsils.

Of course physical defects varied in severity; not every physical defect would interfere with growth; and the same type of physical defect might or might not interfere with the growth of a child according to his health status in other respects, or according to whether or not his mode of living was sufficiently good to allow him to overcome the drain which this defect might put upon the system.

Table VI shows the number of children with 1, 2, or 3 of the above defects.

TABLE VI

DISTRIBUTION OF PHYSICAL DEFECTS (TOOTH DEFECTS NOT INCLUDED)

Number of Defects	Number of Children	
	Group I	Group II
1	14	12
2	9	2
3	4	0
Total	27	14

Records of the illnesses of these groups of children were secured. For Group I we have data for the 6 months during which the intermittency of growth occurred; for Group II for the 10 months of the school year. Table VII shows that when reduced to the same time basis, the incidence of disease was almost twice as great in Group I as in Group II, while the incidence of common cold was over 4 times as great. The non-communicable diseases or conditions in Group I re-

TABLE VII

ILLNESSES

	Group I		Group II	
	No. Cases	Av. No. Cases Monthly	No. Cases	Av. No. Cases Monthly
Children studied	95		100	
Months included in study	6		10	
Cases of cold and grippe	28	4.6	11	1.1
Chicken pox	6	1.0	5	0.5
Whooping cough	9	1.5	11	1.1
Scarlet fever	0	0	1	0.1
German measles	0	0	1	0.1
Mumps	3	0.5	8	0.8
Illnesses from non-communicable diseases	9	1.5	11	1.1
Total number of cases	55	9.1	48	4.8

ceiving treatment included tonsillectomy, digestive difficulty, tonsillitis, asthma, swollen glands, and ear trouble, while in Group II they included tonsillectomy, tonsillitis, severe nose bleed, appendectomy, ear trouble, fractured skull, burn.

A disease might or might not interfere with growth according to its severity, the care received by the patient, or the condition of the child in other respects.

We have seen that the children who have gained regularly have a superior record in habits, illness, and physical defects. It seems worthwhile to compare the number of children in the two groups suffering from deficiencies in each of these respects and from combinations of such deficiencies. Table VIII gives the result of such a study.

TABLE VIII

COMPARATIVE CONDITIONS OF CHILDREN

Health Deficiencies	Number of Children	
	Group I	Group II
None observed	4	17
Defective teeth and one faulty habit only	18	24
Two or more faulty habits only	8	6
Illness only	27	36
Physical defects only	4	9
Poor habits and illness	12	4
Poor habits and physical defects	8	1
Illness and physical defects	8	2
Poor habits, illness and physical defects	6	1
	95	100

It should be explained that the basis of judging habits here is that used in Table IV and the children are divided into habit groups according to whether they are at fault in none, 1 or more of the 5 fundamental health practices mentioned. Considering faulty habits, illness and physical defects, it will be seen that most of the children in Group II suffer from only 1 of these conditions, only 8 per cent of these children being deficient in more than 1 respect, whereas 36 per cent of the children in Group I are deficient in 2 or in all 3.

SUMMARY

The extent to which children fail to gain over different periods of time was determined. Weighings would have been somewhat more accurate without shoes. It is probable that because of the more rapid growth at the adolescent period these findings for elementary school children would not apply to those in the junior and senior high school.

Children who have failed to gain for a 3-month period reflect appreciably poorer health habits and definitely lower health status than

those who have gained regularly. Nearly 3 times as many in the former group (33:12) have 2 or more important unhygienic habits; serious physical defects are nearly 3 times as numerous among them (44:16); nearly twice as many (27:14) have such defects; illness is nearly twice as common (9.2:5). The number of children defective in 2 or all 3 of these respects is over 4 times as great (34:8).

Intermittency in gaining weight does not draw a sharp line between the children who seem to need attention and those who do not; but it is more commonly accompanied by departure from normal health than is regular growth. (Obese children usually gain regularly and too rapidly. This screening is not applicable to them.)

There are always differences in the seriousness of the defects recorded and in the vitality of individual children. The relatively few who showed regular gains, although burdened with a combination of unhygienic habits, illness and defects, appear to have had sufficiently good natural vitality or home care to maintain growth in spite of these conditions.

A few children, 4 per cent, showing intermittency for 3 months, exhibited no departure from normal. A somewhat larger group, 18 per cent, showed only minor difficulties. It may be that our studies failed to reveal existing defects, unhygienic habits or departures from normal organic health. It may be that nervous fatigue, worry over school work, or some other unobservable factor interfered with growth. It may be that a few children who are maintaining a reasonably satisfactory state of health show intermittency to this degree.

CONCLUSION

Since school children are weighed regularly anyway and since children who have failed to grow for a 3-month period show a much poorer condition in respect to habits, illness and physical defects, it seems worthwhile for the teacher, school nurse and school physician to give them individual attention in order that unhygienic living may be discontinued, complete recovery from illness secured, physical defects corrected, and in order that children needing continuing medical care may be referred to the family physician.

REFERENCES

1. Turner, C. E. Precision and Reliability of Underweight Measurement, *A. J. P. H.*, XIX, 9 (Sept.), 1929.
2. Franzen, Raymond. Physical Measures of Growth and Nutrition, *A. C. H. A. Monograph II*, 1929.

Meaning of "Antiseptic," "Disinfectant" and Related Words*

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THE use of technical and semitechnical words in commerce has increased rapidly with the development of research and the growth of advertising. The modern market affords an amazing variety of articles, the manufacture, merits, and use of which are discussed in a voluminous literature.

It is desirable that the scientific terms employed should convey clear meanings to all concerned, or at least not give a wrong understanding. Words do not always have one simple sense. A language is a living, growing organism, and its words take on color, gain fresh content, acquire new senses and lose old ones as the years pass. It is the task of the dictionary worker to discover and set forth the present meanings of words in the light of their history.

In this article definitions and comments are presented for the following terms: antiseptic, bactericidal, bactericide, deodorant, deodorize, disinfect, disinfectant, disinfection, disinfest, germicidal, germicide, insecticidal, insecticide, prophylactic, sterilization, and sterilize.

The conclusions are based chiefly on a study of the more widely disseminated literature in English, especially reference books both scientific and general, but also on conversations and correspondence with physicians, bacteriologists, government officials, manufacturers of chemicals, and laymen.

GERMICIDE, -DAL

Definitions—

germicide, n. Anything that destroys germs (microörganisms); applied especially to agents that kill disease germs.

germicidal, adj. Destroying germs; pertaining to germicides.

Comments—The word *germ,* in the sense of microörganism, is a popular one, but it has been used in forming the convenient terms *germicide* and *germicidal,* which find extensive use in technical as well as popular literature. There seems to be little disagreement as to the meaning of these terms: a substance is a germicide if it will kill germs and whether or not it will do so can be experimentally deter-

* The investigation herein reported was conducted with the aid of a grant from the Insecticide and Disinfectant Manufacturers' Association.

mined. As the words are ordinarily used, the germs referred to are those of disease. The chief point of controversy that could arise is with reference to differences in resistance. In practice it is assumed that a substance represented as a germicide, when used as directed, will kill all ordinary disease germs, but is not necessarily required to be capable of destroying bacterial spores. In combating diseases such as anthrax or tetanus, caused by spore-forming bacteria, germicides or procedures specially effective against spores will be required.

BACTERICIDE, -DAL

Definitions—

bactericide, n. Anything that destroys bacteria.

bactericidal, adj. Destroying bacteria; pertaining to bactericides.

Comments—These terms are synonymous in large part with ***germicide*** and ***germicidal,*** the chief difference being that the two latter are somewhat broader, inasmuch as they may include microörganisms other than bacteria. ***Bactericide*** is a precise term applying only to bacteria and to bacteria of all kinds; in practice, however, it is ordinarily regarded in the same light as ***germicide*** with respect to the resistance of different bacteria; that is, a substance, in order to be called a bactericide, is not necessarily required to be capable of destroying bacterial spores.

ANTISEPTIC

Definitions—

antiseptic, n. A substance that opposes sepsis, putrefaction or decay; one that prevents or arrests the growth or action of microörganisms, either by inhibiting their activity or by destroying them; used especially of agents applied to living tissue.

antiseptic, adj. 1. Having the properties of an antiseptic; opposing sepsis, putrefaction or decay; preventing or arresting the growth or action of microörganisms, especially on or in living tissue. 2. Pertaining to, or characterized by, the use of antiseptics; as ***antiseptic*** surgery.

Comments—The word ***antiseptic*** is derived from two Greek words, ***anti,*** against, and ***septikos,*** putrefactive or rotting. The first known use of it in English, both as an adjective and as a noun, is (according to the *Oxford English Dictionary*) in the *Gentleman's Magazine* in 1751, where sea salt, myrrh and acids are spoken of as antiseptics. In 1774 Priestley remarked on the antiseptic power of "nitrous air" (nitrous oxide). At the time that the word came into existence it was not understood that putrefaction and decay are produced by the agency of microörganisms, but when this became known, the "preventing or arresting the growth or action of microörganisms" took its place naturally in the idea conveyed by the word. Apparently the earliest use of the term was with reference to substances to be applied as medicaments to sores and wounds, and the principal use even today is of substances applied to some part of the body, either externally or internally. The word ***antiseptic*** might be, and has been, applied to substances used to prevent decay in other connections, as of foods or timber, but such materials are usually called ***preservatives*** rather than antiseptics. It will be noticed that, as "antiseptic" is used, it may imply long-continued contact.

Antiseptic and Germicide—Since the killing of microörganisms is the most effective way to prevent their growth it would seem a logical conclusion that any germicide may act as an antiseptic. This appears to be the prevailing view. A great many writers who discuss the matter state or imply that an antiseptic may act either by inhibiting the growth of microörganisms or by killing them. A smaller

number, however, limit the action of an antiseptic to the prevention or arresting of bacterial growth *without* killing the organisms.

Now it is quite natural that, since we have other words such as *germicide* and *bactericide* to denote agents which actually kill microörganisms, the idea that an antiseptic may arrest growth without killing should be emphasized; but the majority of writers do not go so far as to contrast *antiseptic* with *germicide* and to regard the two terms as mutually exclusive. It seems best in accord with the history of the word and with prevailing usage to apply the term *antiseptic* to any agent which prevents further bacterial action, whether it does so by killing the bacteria or not. If this view be taken, any germicide might theoretically serve as an antiseptic. In practice there are exceptions. The action of certain non-material agencies, as sunlight and heat, is often referred to as germicidal but not as antiseptic. Again, many germicides cannot be used as antiseptics because of their harmful effect upon the body tissues. Bearing such exceptions in mind, however, we may say that in general a germicide is an antiseptic or has antiseptic properties.

On the other hand, it is not correct to say that an antiseptic is necessarily a germicide or has germicidal properties, for there are substances which are able to arrest the growth of microörganisms but are not germicides. Here again usage is not unanimous, for certain writers, chiefly those influenced by the practice of antiseptic surgery introduced by Lister, regard the action of antiseptics as a destroying one.

In an investigation of the relative number of authorities supporting each point of view, 165 definitions of *antiseptic* were studied, ranging in date from 1819 to 1930. Twenty, mostly early, make no reference to bacteria. Of the remainder, 66 state or imply that antiseptics arrest or destroy microörganisms, 27 state that they arrest but do not destroy, 12 that they destroy, and 10 that they inhibit growth (without stating how). Most of the remaining 30 definitions are not entirely clear, though a few represent divergent views, for example, that antiseptics neutralize toxins.

To illustrate recent usage on this point, 53 citations from works published in 1921 or later may be summarized as follows: (1) Describing an antiseptic as inhibiting or preventing the growth of microörganisms without necessarily killing them, 37. Of these, 12 are from bacteriological, 11 from medical, and 14 from miscellaneous sources. Three say definitely that antiseptics do not kill bacteria and 4 more distinguish between antiseptic action as non-killing and disinfectant action as killing; the rest either say or imply that antiseptics may kill or else do not mention the question. (2) Stating that antiseptics destroy bacteria, 6. Of these, 2 are from surgeons, 1 is from a chemical dictionary which quotes alcohol and boric acid as examples, and 1 considers the "inhibiting" sense preferable. (3) Not giving a clear issue, or controversial, 10.

It should be remembered that whether a given substance is a germicide or an antiseptic, or neither, depends on several factors. One is the *strength* in which the agent is used; it may be a germicide in a solution of a certain concentration and only an inhibiting agent at a lower concentration. The *time of contact* and *mode of application* must also be taken into account; a solution which is germicidal when in contact with the material for 30 minutes may not be so for an exposure of 5 minutes, and imperfect contact of course lessens effectiveness. The *nature of the microörganism* must also be considered, since the resistance of different kinds varies greatly, so that a substance might be germicidal for one variety and only inhibitory

toward another, within a definite range of concentration. And there are still other factors, such as the *temperature,* the *abundance of the microörganisms* and the *nature of the material* in which the microörganisms are found.

DISINFECT, -TANT, -TION

Definitions—

disinfectant, n. An agent that frees from infection; usually, a chemical agent which destroys disease germs or other harmful microörganisms (but not, ordinarily, bacterial spores); commonly used of substances applied to inanimate objects.

disinfectant, adj. Freeing from infection, especially by destroying disease germs or other harmful microörganisms.

disinfect, v.t. To free from infection, especially by destroying disease germs or other harmful microörganisms.

disinfection, n. The act or process of disinfecting.

Comments—The verb *disinfect* first appears in the literature at about the beginning of the 17th century, and the other forms much later. Like *antiseptic,* this group of words came into use before the germ theory of disease originated. It was believed that certain " effluvia " existed in the air and on furniture, clothing, etc., and communicated certain diseases; hence, the infection must either be removed or destroyed. It is now recognized that the infection is caused by microörganisms, but we continue to use *disinfectant* as a convenient term for any agent that accomplishes the result of freeing from infection.

Wilcox (*Pharmacology and Therapeutics,* ed. 7, p. 13) states that " the term *disinfectant,* by extension, is applied to those agents which kill non-pathogenic bacteria, as well as to those which destroy disease germs." This, it seems, involves an extension of the meaning of the word " disinfection " to include freeing from other undesirable microörganisms besides those causing human disease.

Disinfectant and Germicide—For some time after the advent of the germ theory of disease, authors hesitated to describe the action of a disinfectant as being wholly or principally the destruction of microörganisms. They spoke of " restraining " or " neutralizing " the germs, of destroying the poisons produced, of deodorizing, etc. It would seem that their idea of " ridding of infection " was clear but not the precise method by which disinfectants operate. Popularly this vagueness persisted much longer. Albert Buck (*Reference Handbook of the Medical Sciences,* 1894) says: " Popularly, the term *disinfection* is used in a much broader sense. Any chemical agent which destroys or masks bad odors, or which arrests putrefactive decomposition, is spoken of as a *disinfectant* . . . This popular use of the term has led to much misapprehension." This misapprehension seems to have decreased with the spread of scientific knowledge.

Of 143 definitions of " disinfectants," dating from 1854 to 1930, 25 (chiefly of earlier dates) make no reference to microörganisms. Of the remainder, 95 define disinfectants as germ destroyers, 9 state that they may also act by removing the germs, and 8 say that they either destroy germs or arrest their action. Of the 95 citations, 52 define disinfectants as destroyers of *disease* germs, 34 merely say that they destroy germs or are germicides, while 9 specifically state that they destroy all germs, non-pathogenic as well as pathogenic.

Hence it seems to be generally expected that any substance used as a disinfectant will destroy the cause of infection, that is, will act as a germicide.

The word *disinfectant* still carries with it much of its original connotation. It suggests the cleaning of sick rooms, clothing, bedding, lavatories, stables and in

fact of any places or things that might harbor disease. By contrast, *germicide* is a precise, colorless word, conveying its literal meaning and little more. Aside from their history and connotations, however, *disinfectant* and *germicide* appear today to have the same meaning when applied to substances used in fighting disease.

Disinfectant and Antiseptic—If we accept certain conclusions from the above discussion, namely, that the substances called disinfectants are germicides, and also that in general germicides may act as antiseptics but that antiseptics are not necessarily germicides, then it follows that disinfectants may (theoretically at least) act as antiseptics, but that antiseptics may not necessarily act as disinfectants. Due attention should of course be paid to the different connections in which the two words are used.

STERILIZE, -ZATION

Definitions—

sterilize, v.t. To render sterile, that is, free from all living microörganisms.

sterilization, n. The act or process of sterilizing, or freeing from all living microörganisms.

Comments—These are exact terms, which came into use (in the sense under discussion) to express a precise idea, namely the freeing of a material, container, or space from living microörganisms of all kinds. There is no distinction between disease germs and other germs, or between resistant and nonresistant varieties or forms. If a thing has been treated in such a way that no growths can be produced from it by appropriate culture, then—and then only—has it been completely *sterilized*.

One of the best ways to accomplish sterilization is maintaining for a sufficient time at a temperature at which microörganisms cannot live; hence the use of the word *sterilize* suggests to some the destruction of microörganisms by *heating*. To others it includes also the notion of the use of strong chemical agents. The word calls to mind the treatment of surgeons' instruments, gauze bandages, culture dishes, and other apparatus rather than the treatment of the sick room or of the human body.

Disinfect and Sterilize—It has been noted that *disinfect* refers particularly to the destruction of disease germs (especially the vegetative forms), while *sterilize* denotes the freeing from all organic life. Hence *sterilize* is the more drastic of the two terms and it might easily happen that something is thoroughly disinfected without being completely sterilized. This is true, for example, of the customary treatment of milk cans, milk bottles, etc., in the dairy industry, where treatment sufficient to prevent diseases and spoiling of the milk is not necessarily sterilization.

DEODORANT, -RIZER

Definition—

deodorant, deodorizer, n. Anything that destroys or masks offensive odors.

Comments—A deodorant may or may not be an antiseptic or disinfectant. The popular notion that danger from infection disappears with the removal of disagreeable odor is of course a mistaken one.

INSECTICIDE, -DAL

Definitions—

insecticide, n. A substance that destroys insects, especially a preparation used for this purpose.

insecticidal, adj. Of or pertaining to insecticides; destroying insects.

Comments—As defined, the word *insecticide* is limited to the destruction of in-

sects. The Insecticide Act of 1910 defines it somewhat more broadly, however, as "any substance or mixture of substances intended to be used for preventing, destroying, repelling, or mitigating any insects." Also, the Food and Drug Administration admits within the term *insect* small invertebrate animals such as spiders and mites which do not belong to the order Insecta but are liable to be called insects in popular language. Insecticides may be effective against one type of insect but not necessarily against all types of insects. Insecticides usually act as stomachic or respiratory poisons; their method of application or use varies with the type of the insecticide and of the insect against which it is applied. An insecticide although usually used to destroy insects does not necessarily give a 100 per cent kill.

DISINFEST

Definition—

disinfest, v.t. To rid of infestation; to free from infesting insects, rodents or other small animals.

Comments—The earliest appearance of the word of which the committee has record is in the report of the Committee on Standard Regulations for the Control of Communicable Diseases, A. P. H. A., 1926, in which the following definition appears: "By disinfesting is meant any process, such as the use of dry or moist heat, gaseous agents, poisoned food, trapping, etc., by which insects and animals known to be capable of conveying or transmitting infection may be destroyed."

Since a word covering the above process was apparently needed, and since the inclusion of this sense in the meaning of *disinfect* (as has been the practice of some) seems incorrect and undesirable, the introduction and use of the comparatively new word *disinfest* are to be commended.

PROPHYLACTIC

Definitions—

prophylactic, n. Anything that prevents, or that contributes to the prevention of, disease; a preventive.

prophylactic, adj. Guarding from disease; preventing, or contributing to the prevention of, disease.

Comments—The meaning of *prophylactic* is wide. It applies to anything which even helps to ward off disease, as fresh air, nutritious diet, and rest, which serve as preventives of tuberculosis and other ailments. One writer has even used the term "mental prophylactics." Various medicinal preparations are also called prophylactics. It would seem however that a substance, to be called a prophylactic against a given disease, should be demonstrated to have some efficacy for the purpose in question under the conditions of its intended use.

CONCLUSION

It has been announced as a principle of legal practice that "language used in the label is to be given the meaning ordinarily conveyed by it to those to whom it is addressed." This commends itself as a sound and wise ruling, for the general public cannot be expected to be acquainted with special technical meanings or to have information proper to experts alone. Nevertheless, it is possible to draw wrong conclusions from this principle. People constantly make use of words of which they do not know the accurate meaning. They know barely

enough about it for ordinary purposes; the rest they leave to the specialist. This is eminently true of such things as drugs and medicaments. It is small wonder that similar terms are sometimes confused in the popular mind.

It may of course happen in the development of language that a term becomes so confused that it undergoes a complete change of meaning and that the new meaning becomes commonly accepted. But the mere fact that the average person has a confused notion of a word which is used correctly by writers and careful speakers does not justify acceptance of the confused meaning.

The terms *antiseptic* and *disinfectant* may be taken as examples. There appears to be some haziness in the mind of the public regarding their signification; yet the greater part of the literature is in fair agreement as to the derivation, history, and present meaning of the two words. Moreover, what popular confusion may exist is not so much with respect to the *root idea* of the words ("antiseptic," opposing decomposition; "disinfectant," ridding of infection) as regarding the mechanism by which the result is effected (removing germs, killing germs, or preventing the growth of germs). It is the result that chiefly concerns the public; the expert must be relied on for exact knowledge of the mechanism.

So far as the writer can determine after talking with various persons, bacteriologists, physicians, druggists, manufacturers of chemicals, and government officials, there do not seem to be serious differences of opinion among professional men as to the meanings of the various terms now under discussion.

In so far as differences exist, they seem to relate rather to the question as to what is a fair use of the terms in connection with certain manufactured products, when the circumstances under which these products are to be used are duly considered. For example, there seems to be pretty general agreement that the term *antiseptic* (at least aside from surgery) may properly be applied to a substance which merely arrests the growth of microörganisms without killing them. There is apparently no question, for example, as to advertising a bandage impregnated with iodoform as an antiseptic dressing for wounds or as to calling iodoform or any similar agent an antiseptic when so used. The question seems to be whether a substance which is not a germicide but which acts as an antiseptic so long as it remains in contact with the area to be protected can fairly be called an antiseptic when its application is necessarily brief as in the case of a mouth wash, gargle or tooth paste. Again, the agreement on the meaning of the term *prophylactic* seems to be good. It is recognized as a very broad term.

Apparently the main question at issue, if there is one, is under what circumstances a given substance may fairly be claimed to have a prophylactic effect.

The adjustment of such questions as to what is fair under different circumstances seems to lie outside the province of defining meanings of words. It seems to be a matter of bacteriological and medical knowledge, a spirit of fair play, and good common sense. If the writer may hazard a suggestion, it would be that, since the correct application of certain terms of which *antiseptic* and *disinfectant* may serve as types depends on a number of factors (in the present case, strength, time of contact, type of organism, etc.), due regard should always be had to these factors as they occur, or are likely to occur, in actual practice.

Honor to Whom Honor Is Due

THE address of Stokes [1] has elicited an answer and brought out references which have been overlooked or forgotten by the majority of people of this age. The particular statement involved is that "Metchnikoff with Roux 'had accomplished the first successful transfer of syphilis to apes' in 1905." From these reports and the discussion [2] given of them, it seems certain that Edwin Klebs, whose name combined with that of Loeffler is so well known in connection with the discovery of the germ of diphtheria, had seen the spirocheta in the lesions of syphilis nearly 30 years before the discovery by Schaudinn, and had inoculated apes with the material, with the production of characteristic lesions.

The report by Klebs states "(1) that in syphilitic lesions there are regularly found spirillar organisms, slender motile rods 2 to 5 microns long, which seem to belong in Ehrenberg's botanical group of monads, and which Klebs names, because of their spirillar shape, 'helico-monads'; (2) cultures of these organisms are obtained on a special medium of isinglass jelly; (3) successful transfer of syphilis to animals was obtained only in apes (*Macacus*), very suggestive but not entirely conclusive results in the case of subcutaneous inoculation of culture material (July 8, 1875), entirely conclusive in the case of inoculation with freshly excised material from a human primary lesion (December 29, 1877)."

Dr. Klebs, a son of Edwin Klebs, recognizes that there is now no way to control the exactness of the findings reported, but states that Metchnikoff recognized that Klebs was the first to have seen the spirocheta and to have inoculated apes with syphilis. Further, Ghon made the statement that at the Pathological Institute at Prague the skull of the second ape inoculated was still preserved and showed characteristic lesions.—Arnold C. Klebs, Discovery and Discoverers, *Science*, Feb. 12, 1932, p. 191.

REFERENCES

1. *Science*, 74: 502–506.
2. *Science*, 75: 191–192.

A Health Aspect of Frozen Vegetables*

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THE commercial preservation of foods by freezing storage apparently began at Salem, Ore., about 20 years ago, when berries were first frozen in large containers for hotel and wholesale trade. Later, freezing was widely used for the preservation of fish. Large quantities of fish are now frozen and marketed in retail containers, facilitating handling and improving considerably the sanitary conditions.

In recent years the number of different foods preserved and marketed in a frozen condition has tremendously increased. At present, many fruits and some vegetables are being stored in this manner. Numerous difficulties have arisen in developing methods best suited to the freezing of these and similar products, and some are still unsolved. In the marketing and handling of frozen fruits and vegetables, one question is of paramount importance, not only from the standpoint of public health, but the future of the entire frozen-food industry. The possibility of botulinus poisoning resulting from the consumption of defrosted, improperly handled vegetables and fruits must be considered. Marketing such products through the small grocery store directly to the consumer increases considerably the importance of this factor.

As the preservation of foods by freezing is comparatively new, it has received very little attention from bacteriologists or public health workers. Because of the lack of information on the occurrence and importance of botulinus spores on frozen vegetables, an extensive investigation was undertaken to determine the survival of these microorganisms in such products and their possible production of toxin when the vegetables have been improperly handled after defrosting or when they are accidentally defrosted during storage or transportation.

As far as we are aware, the commercial freezing of vegetables has been confined to limited amounts of peas, spinach, and asparagus. Green peas, however, have been widely considered for preservation by this method. Moreover, of the vegetables commercially frozen, peas are believed to be the most susceptible to microbial decomposition, and

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they are known to support abundant growth of, and toxin production by *Clostridium botulinum*. For these reasons peas were selected for this investigation.

The investigation was divided into two parts: a study of the effect of freezing on *Cl. botulinum* spores, both as regards survival and toxicity, and the possibility of the development of botulinus toxin in peas which had been improperly handled after defrosting or when accidentally defrosted during storage or transportation. Neither study has been completed, but the latter is reported in part here.

CONDITIONS STUDIED

The samples were all packed, inoculated, and frozen in Seattle, Wash., which might be considered the center of the industry at present. The investigation included:

1. Three methods of preparing the peas: (all hand shelled)
   a. Washed in cold water
   b. Washed in cold water, then blanched in boiling water
   c. Washed in cold water, then blanched in boiling brine
2. Four types of containers:
   a. No. 2 plain tin cans (sanitary type)
   b. Rectangular 1-lb. cardboard boxes (known as "Peters" containers)
   c. Wide-mouthed 16-oz. commercial glass jars equipped with metal friction caps for sealing under a vacuum
   d. 1-lb. cardboard monotubs (circular cardboard "tubs" with cardboard tops)
3. Three degrees of inoculation with *Cl. botulinum* spores:
   a. No inoculation (controls)
   b. Dilute inoculation (see text)
   c. Concentrated inoculation (see text)
4. Two methods of packing:
   a. With vacuum (tin and glass containers only)
   b. Without vacuum
5. Four methods of defrosting:
   a. Water bath at 43° C. and examined immediately
   b. Icebox for 3½ days (½ day for defrosting, then 3 days storage)
   c. Room temperature for 3½ days
   d. Water bath at 43° C. until defrosted (2 hours), cooked in 2.5 per cent brine on open fire, then stored at room temperature for 3 days

Each test condition was selected because of some particular relationship it bears either to the handling of frozen peas or to the growth of *Cl. botulinum*. The four types of containers have all been recommended for commercial use in freezing vegetables. Further, the con-

ditions of anaerobiosis might be different in the various types of containers. Three methods of treating peas prior to packing have been recommended. The natural resistance of plant tissues to bacterial invasion is retained for some time after the product has been removed from the plant, but it is largely destroyed by hot water. Blanching, therefore, might exert considerable influence in the growth of botulinus in the defrosted peas. Blanching in hot brine was used to determine the inhibitive action of salt on these microörganisms.

The influence of large numbers of bacterial spores on the sterilization of food products has been well shown by Bigelow and Esty[1] and their coworkers in studies of the factors which influence thermal-death-time determinations. Whether or not a similar influence would occur in the freezing of large numbers of spores was not known; therefore, each series was prepared in triplicate. The first, not inoculated, served as controls; in the second each filled container was inoculated with less than 100 botulinus spores; and in the third with approximately 100,000,000 spores. The technic of inoculation is outlined later.

The importance of a vacuum in the possible growth of botulinus spores in such a product hardly needs explanation. Since *Cl. botulinum* is an anaerobe, the removal of air may materially aid growth. The vacuum packing was confined to the tin and glass containers.

The various methods of defrosting were planned to duplicate as far as possible conditions which might occur in the marketing and consumer handling of the product. Examination immediately after defrosting shows whether or not toxin has been formed while the product was frozen or was released from the spores by mechanical injury in freezing, and also serves as a control on the other treatments. Holding in the icebox for 3½ days may occur in the home. Approximately ½ day is required to defrost the product in a small ice refrigerator. Storage at room temperature for 3½ days allows something less than ½ day for defrosting and a storage period of about 3 days. The fourth method of treatment consisted in defrosting in a 43° C. water bath, boiling the peas in a 2.5 per cent brine for 10 minutes, then storing them in pint jars at room temperature for 3 days in order to determine the effect of cooking on the susceptibility of peas to the development of botulinus toxin.

Each test series of containers was assigned a number for later reference, which, with the conditions under investigation in each series, are given in Table I.

Under each test condition at least 16 containers were prepared. More than 1,000 containers were used, including 320 for tests on the influence of the length of storage in a frozen condition on the numbers

TABLE I

SERIES NUMBERS USED IN PREPARATION OF THE SAMPLES

Conditions Tested		Inoculation	Types of Containers *			
			Monotubs	Peter's Type	Tin Cans	Glass Jars
Blanching	Washed cold water	None	1	10	19	28
		Dilute	2	11	20	29
		Concentrated	3	12	21	30
	Washed cold water, blanched hot water	None	4	13	22	31
		Dilute	5	14	23	32
		Concentrated	6	15	24	33
	Washed cold water, blanched hot brine	None	7	16	25	34
		Dilute	8	17	26	35
		Concentrated	9	18	27	36
Vacuum	With vacuum †	None			37	43
		Dilute			38	44
		Concentrated			39	45
	No vacuum †	None			40	46
		Dilute			41	47
		Concentrated			42	48

* Sixteen containers prepared under each series number
† Peas washed in cold water and blanched in hot water

of *Cl. botulinum* spores living. This latter section of the investigation has not been completed and will not be reported here.

TECHNIC OF INOCULATION AND PACKING

One of the greatest difficulties encountered in extensive investigations with the botulinus microörganisms is the possible variation in toxicity when the organisms are subcultured in mediums over extended periods of time. This was overcome by the preparation of sufficient dried spores to make all inoculations. As vegetables generally carry some soil contamination, they are usually washed in water and blanched before they are packed for freezing. In the soil, botulinus spores are in a more or less dry state, but if present on the peas, they become moistened during washing or blanching, and if they remain are probably frozen while wet. To duplicate these conditions as closely as possible, buffer suspensions of dried *Cl. botulinum* spores were used in the inoculations. The dried spores were prepared according to the following technic: *

* The dried spores were prepared by Elizabeth W. Sommer at the William Hooper Foundation for Medical Research in San Francisco, Calif.

1. Cultures were grown on casein-digest agar (pH 7.4) for 5–6 days at 37° C.
2. The growth was suspended in distilled water, centrifuged, and washed twice with distilled water, twice with alcohol and twice with ether.
3. The material was then dried *in vacuo*.
4. The total number of living spores and their heat resistance were determined.

Because cultural differences are important in investigations involving the botulinus microörganism, the following 4 strains were used in this study:

1. *Clostridium botulinum*, Type A, strain No. 19, isolated from asparagus which was held responsible for the botulism outbreak at Boise, Ida.
2. *Clostridium botulinum*, Type A, strain No. 62, isolated from a liver infarct of a cow at Redwater, Nev.
3. *Clostridium botulinum*, Type B, strain No. 174, isolated from Italian canned onions.
4. *Clostridium botulinum*, Type B, strain No. 186, isolated from canned ham.

A mixture containing equal amounts of dried spores of each of these strains was prepared, and for inoculation definite quantities weighed on an analytical balance were suspended in Sorenson's buffer solution of pH 6.9 (2) and suspended by shaking with glass beads. It was found desirable to add 2.0 c.c. of the suspension to each container. Each 2.0 c.c. was made to contain 1.0 mg. of dried spores, so that with the most concentrated inoculations, each container received approximately 100,000,000 spores.

The inoculations were made in Seattle, Wash., and all samples opened and examined in Washington, D. C. In preparing the suspensions the work was done in one room, and the raw materials, samples, and inoculations were handled in a distant room. All equipment and suspensions were either sterilized or soaked with a solution of mercuric chloride after each day's run. No materials except the stock supplies of dried spores were carried over from one day to the next.

The peas, shelled by hand, were purchased from a Japanese grower in the vicinity of Seattle who delivered the desired quantity to the laboratory daily. What influence this method of shelling had on the spore contamination is not known.

PROCEDURE

About 5 lb. of peas were placed in a covered wire basket and agitated vigorously in a tank of clean, cold water. By this procedure, a large part of the dirt was removed. After they had drained about 2 minutes, some were packed in the containers, and the rest blanched by immersing in boiling water. The cold peas lowered the temperature of the water about 10° C. The water resumed boiling in about

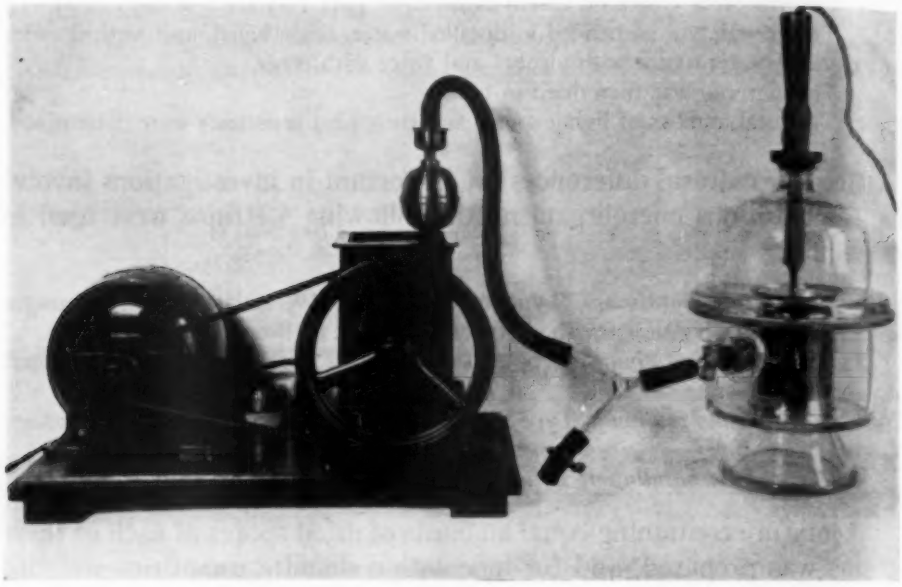

FIGURE I

APPARATUS USED IN SEALING TIN CONTAINERS UNDER A VACUUM

2 minutes and the peas were removed approximately 2 minutes later. After blanching, they were cooled and the containers filled.

The filled containers were inoculated immediately with 2.0 c.c. of the spore suspensions. Preliminary tests with eosin solution had shown that this amount of added liquid would give a reasonably uniform inoculation. The monotubs were closed by pressing into place the waxed cardboard tops. The "Peters" type boxes were closed, wrapped in moisture proof wax paper and tied with cord. In commercial practice the wax wrapper is generally sealed in place in order to make the container as moisture proof as possible. The tin cans were sealed on a hand sealing machine.*

The containers which were to be packed under a vacuum were punctured through the lid with a small nail, then placed in a desiccator, through the top of which an electric soldering iron had been fitted by means of rubber tubing or a flexible cork stopper (Figure I).

A small piece of solder containing flux was placed beside the opening in the can lid, and the desiccator was closed. When a vacuum of 20 inches had been drawn, the hot iron was used to seal the hole, the vacuum released, and the can removed.

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* The authors are indebted to the Research Laboratories of the Continental Can Company for the method of sealing individual tin containers under a vacuum.

The glass jars were sealed by means of a vacuum sealing machine,* although the vacuum was used in only a part of the containers.

After the containers had been closed they were put in storage as rapidly as possible, but as the cold storage was located at some distance, 5 hours elapsed before some reached the freezing room. They were placed on the floor of a storage room maintained at 10° F. and widely separated so as to allow as rapid freezing as possible. Each was frozen within a few hours. They were left in the freezing room until shipped.

Preparation and freezing of all the samples required 25 days. The period of storage in Seattle ranged from 7 to 25 days. Studies to be reported later have shown not only that the period of freezing storage does not influence the number of spores surviving, but also that different rates of freezing ("quick-freezing" or "slow-freezing") do not have different effects upon the spore population.

When all the samples had been frozen, they were packed in fiber cases, insulated with shredded paper, and sealed, then loaded into a pre-cooled refrigerator car, and packed on the floor immediately in front of the lower opening in the ice bunker. At Chicago, all samples were removed to a freezing storage room (0° F.) and held there for 24 hours. Although the samples were in good condition and possibly did not need additional freezing, the procedure was adopted as a precaution against defrosting. The cases were then packed into the end of a pre-cooled refrigerator car and shipped to Washington, D. C., where they were transferred immediately to a cold room, and stored at a temperature of approximately 18° F. until removed for examination.

EXAMINATION OF SAMPLES

The samples were defrosted according to 4 procedures. In defrosting those for immediate examination the tin containers, after removal from cold storage, were immersed at once in a water bath maintained at 43° C. The cardboard containers were placed in a pan which was lowered into the water, and the entire bath was covered. They required a slightly longer period for complete defrosting than did the tin containers.

Another series of containers was defrosted in an icebox and stored there for 3 days. The icebox was small and poorly insulated. The temperature of the food compartment varied somewhat, although the box was iced daily. At the end of the storage period the samples were examined as later described.

The containers defrosted at room temperature were left undisturbed on the laboratory table for 3½ days, during which most of the

* Loaned by the Hazel-Atlas Glass Company.

tin containers swelled so much that puncturing was required, a very small hole being made in each lid. After 3½ days the samples were examined according to a regular laboratory procedure.

The peas which were to be cooked were defrosted in the 43° C. water bath; transferred to an open pan; 500 c.c. of 2.5 per cent salt solution was added; and the whole was boiled vigorously for 10 minutes. In this time practically all the liquor boiled away. This was made up to original volume; the peas and liquor were transferred to a sterile pint jar and allowed to cool. The lid was then loosely clamped on, and the jar stored at room temperature for 3 days. At the end of this time the examination was made as outlined below.

The samples for immediate examination were completely defrosted, and at the end of the storage period for those left at room temperature and in the icebox, the peas of each sample were transferred to a sterile pint jar. The original containers were washed out with 50 c.c. of sterile water, which was added to the pint jar. During most of this study the peas were then crushed with a sterile spoon. Each jar was shaken vigorously 50 times. The liquor was then removed and divided into several parts as indicated in Figure II. One portion was used for the determination of total anaerobic bacterial and spore counts and the isolation of *Cl. botulinum,* one for the determination of the pH, and one for toxicity tests. Another portion, together with each pint jar and its contents, was held in reserve in cold storage.*

Total numbers of anaerobic bacteria as well as spores were determined on each sample by the dilution method. Beef-heart medium, sterilized by heating 3 times in flowing steam, with incubation periods between, was used. All tubes were tested before use by incubation for 5 to 7 days at 37° C., and rarely were non-sterile tubes found.

In making the spore counts, tubes of the liquor removed from the peas were first heated in boiling water for 10 minutes. After inoculation, the tubes of medium were stratified with autoclaved vaseline, and incubated for at least 3 weeks at 37° C. All series of tubes were run in duplicate. Two sets of results have been noted, (1) the greatest dilution at which gas was produced in the beef-heart medium; (2) the greatest dilution which showed growth resembling that produced by *Cl. botulinum.*

In studying samples which did not contain botulinus toxin an effort was made to identify *Cl. botulinum* in the anaerobic tubes prepared for spore determination. For this purpose the tubes representing the greatest dilution showing growth resembling that of *Cl. botulinum* were

* In the first part of the investigation the reserve portions of the samples were stored at 34° to 36° F., but later these and all subsequent portions were stored at 18° to 20° F.

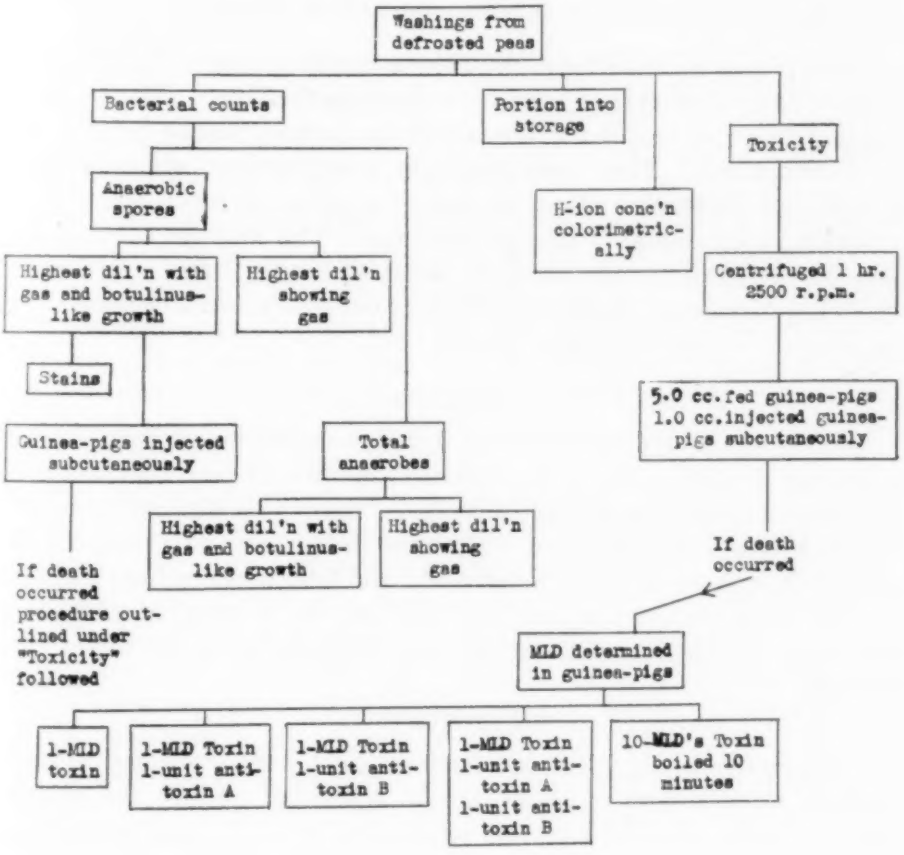
used. The suspected cultures were injected subcutaneously into guinea pigs, and the culture was identified by neutralization of the toxin with antitoxin, according to standard procedures.

The pH of the various samples was determined colorimetrically, occasionally checked electrometrically.

Toxicity tests were made on the liquor removed from every container. The wash water was centrifuged at approximately 2,500 r.p.m. for 1 hour, which yielded a clear liquor satisfactory for feeding and injection. Guinea pigs have been used since preliminary comparisons of their reactivity with that of white mice indicated that much greater reliability could be placed upon the results with the former in this particular investigation. The centrifuged liquor of each sample was administered to 4 guinea pigs. Two were force fed, and 2 were injected subcutaneously. The fed pigs each received 5 c.c. per 250

FIGURE II

LABORATORY EXAMINATION OF SAMPLES


Washings from defrosted peas
Bacterial counts
Portion into storage
Toxicity
Anaerobic spores
H-ion conc'n colorimetrically
Highest dil'n with gas and botulinus-like growth
Highest dil'n showing gas
Centrifuged 1 hr. 2500 r.p.m.
Stains
5.0 cc. fed guinea-pigs 1.0 cc. injected guinea-pigs subcutaneously
Guinea-pigs injected subcutaneously
Total anaerobes
Highest dil'n with gas and botulinus-like growth
Highest dil'n showing gas
If death occurred procedure outlined under "Toxicity" followed
If death occurred
MLD determined in guinea-pigs
1-MLD toxin
1-MLD Toxin 1-unit antitoxin A
1-MLD Toxin 1-unit antitoxin B
1-MLD Toxin 1-unit antitoxin A 1-unit antitoxin B
10-MLD's Toxin boiled 10 minutes

gm. of body weight, the injected ones 1 c.c. per 250 gm. Proportionate dosages were used for pigs varying from the standard weight, but in no case was an animal used for forced feeding that required more than 5 c.c.

When the pigs showed no reaction the sample was rated negative for the presence of toxin. If illness or death occurred in at least 1 pig, further tests were made to determine whether or not it was caused by botulinus toxin, and if so to identify the type of culture responsible.

The centrifuged liquor and physiological salt dilutions thereof were injected subcutaneously into guinea pigs, 1 c.c. per 250 gm. of body weight. The smallest amount, that is, the highest dilution, causing death within 96 hours, was the m.l.d. for that particular sample. A final confirmatory series was run as follows:

1. One m.l.d. toxin
2. One m.l.d. toxin and 1 unit of antitoxin, Type A
3. One m.l.d. toxin and 1 unit of antitoxin, Type B
4. One m.l.d. toxin and 1 unit of antitoxin, Type A, and 1 unit of antitoxin, Type B
5. Ten m.l.d.'s toxin heated in boiling water for 10 minutes

Two pigs were used for each of these combinations. Sterile physiological salt solution was used as a dilution medium. The mixtures were adjusted so that 1 c.c. contained the proper dosage for 250 gm. of body weight. The toxin-antitoxin combinations were carefully mixed, and allowed to stand at room temperature for 1 hour before injection subcutaneously into guinea pigs. The findings are reported only when definite results were obtained within 96 hours. In no case were they considered positive until clear-cut results were obtained, and the identity of the toxin was proved.

RESULTS

Before discussing the results in detail it should be emphasized that toxin was obtained only in the defrosted samples of peas that had been held at room temperature, and that all of these were definitely spoiled. No toxin was obtained from containers defrosted and examined immediately or from containers defrosted and held in an ordinary icebox.

The examinations of only the tin and the cardboard containers have been completed. The former were finished before the latter were studied.

TIN CONTAINERS

Seventy-two tin containers of frozen peas were examined; 24 had received no inoculation, 24 the dilute inoculum, and 24 the concentrated. Each of these lots was subdivided so that samples were de-

frosted according to each of the 4 methods described. During storage 14 of the containers became toxic, including 2 controls, 4 that had received dilute inoculation, and 8 that had received heavy inoculation, and 8 of the uninoculated containers yielded *Cl. botulinum* cultures. The results are summarized in Table II.

TABLE II

BOTULINUS TOXIN AND CULTURES FOUND IN PEAS IN TIN CONTAINERS

Total Containers	Inoculation	Tins Containing Botulinus Toxin			Tins Containing Botulinus Spores	
		Number	Per cent	Type of Toxin	Number	Per cent
24	None	2	8.3	2 Type B	10	41.6
24	Dilute	4	16.6	2 Type A 2 " B	12 *	50.0 *
24	Concentrated	8	33.3	2 Type A 6 " B	24 *	100.0 *
Total 72		Total 14	19.4	Total 4 Type A 10 " B	Total 46 *	63.8 *

* Presumptive.

The cultures isolated from the containers receiving the dilute and concentrated inocula have not been identified or typed, since such information would add little to the results obtained. The isolation of *Cl. botulinum* spores (presumptive) from only a few more of the dilute-inoculated containers than from the uninoculated controls indicated that the "dilute" inoculum contained only a few botulinus spores per c.c. Dilution counts in beef medium had shown approximately 10 spores per c.c. of suspension.

The results when the various toxic containers are considered from the standpoint of the different methods of defrosting and storage are very interesting. The 72 containers referred to in Table II are classified in Table III according to their treatment following defrosting.

In Table III a striking contrast is revealed between the containers of peas defrosted and held under varying conditions. Particularly striking were the results on the peas which, after being boiled for 10 minutes, developed toxin at room temperature.

The tests for total anaerobic bacteria and total anaerobic spores showed that in almost all containers the total anaerobic cells far outnumbered the spores. The length of the period of holding at warm

TABLE III

NUMBER OF TOXIC TIN CONTAINERS OBTAINED UNDER EACH OF 4 METHODS OF DEFROSTING AND STORAGE

Total containers	Inoculation	Containers Defrosted by			
		Water bath at 110° F. Not held	Icebox held 3½ days	Room temperature held 3½ days	Water bath at 110° F. Brine cooked held Room temperature 3 days
24	None	0	0	0	2 (8.3%)
24	Dilute	0	0	0	4 (16.6%)
24	Concentrated	0	0	2 (8.3%)	6 (25%)
Totals 72		0	0	2 (2.7%)	12 (16.6%)

temperatures after defrosting, of course, influenced these counts. Table IV shows the results obtained on the uninoculated tin containers. The studies so far have not covered those blanched in brine. Duplicate containers for each test condition have been examined. The "Sample Numbers" are as given in Table I. Each container number has received a letter in accordance with the method of defrosting and storage, as follows:

1. Water bath ..... A and B
2. Icebox—3½ days ..... C and D
3. Room temperature—3½ days ..... E and F
4. Water bath—boiled—held room temperature .... G and H

The nature of the botulinus cultures isolated from the uninoculated tin containers is of interest to both the food technologist and bacteriologist. The survey of various soils made by Dubovsky and Meyer[3] showed that botulinus spores are present in a large number of gardens. The isolation of botulinus spores then from a comparatively large number of the uninoculated containers is of exceptional interest. The relation of the methods of preparation and defrosting to the type of botulinus culture obtained is given in Table V. Of the 24 uninoculated containers examined, cultures were isolated from 6 in which the peas had not been blanched and had not become toxic, and 4 were from peas which had been blanched, 2 of which contained toxin. This is

TABLE IV

ANAEROBIC COUNTS, pH, AND *Cl. botulinum* IN UNINOCULATED TIN CONTAINERS DEFROSTED BY EACH OF 4 METHODS

Sample No.	Method of Defrosting	Method of Preparation	pH	Bacterial Counts		*Cl. botulinum* Demonstrated	
				Anaerobes	Anaerobic spores	Dilution	Culture Type
19		Washed cold water	6.8	100	100	1–10	A
19			6.8	100	10	1–10	A
22	A & B	Blanched hot water	—	0	0	—	—
22			—	0	0	—	—
37		Blanched hot water	6.6	10,000,000	0	—	—
37		Vacuum packed	6.2	10,000,000	10	—	—
19	C & D	Washed cold water	7.0	1,000	10	—	—
19			7.0	100	10	1–10	A
22		Blanched hot water	5.4	1,000,000,000	0	—	—
22			5.4	1,000,000	10	—	—
37		Blanched hot water	5.4	10,000,000	0	—	—
37		Vacuum packed	—	10,000,000	0	—	—
19	E & F	Washed cold water	5.4	1,000,000,000	0	1–10*	B
19			5.4	1,000,000,000	0	1–10*	A
22		Blanched hot water	5.4	1,000,000,000	10	—	—
22			5.4	100,000,000	10	1–10*	B
37		Blanched hot water	5.4	100,000,000	10,000,000	—	—
37		Vacuum packed	5.4	100,000,000	0	—	—
19	G & H	Washed cold water	—	10	0	—	—
19			—	10	10	1–10*	A
22		Blanched hot water	6.2	100,000	0	1–10*	B
22			6.2	1,000,000	1,000	1–1,000	B
37		Blanched hot water	6.6	10,000,000	10	1–1,000,000*	B
37		Vacuum packed	6.6	100,000	0	—	—

* Demonstrated in anaerobic count tubes, not spore count.

TABLE V

TYPES OF *Cl. botulinum* CULTURES OBTAINED FROM UNINOCULATED TIN CONTAINERS DEFROSTED BY VARIOUS METHODS

Sample Number	Method of Preparation	Method of Defrosting	Botulinus Cultures	
			Type	Dilution Count
19A	Washed cold water	Water bath 110° F.	A	10
19B	" " "	" " "	A	10
19D	" " "	Icebox	A	10
19E	" " "	Room temp.	B	10
19F	" " "	" "	A	10
19H	" " "	Boiled brine, room temp. *	A	10
22F	Blanched hot water	Room temp.	B	10
22G	" " "	Boiled brine, room temp.	B	10 †
22H	" " "	" " " "	B ‡	
37G	Blanched—Vacuum packed	" " " "	B ‡	

* See 5 c under " Conditions Studied."
† This culture was obtained from a tube in the anaerobic count series, not from the spore count series.
‡ These cultures were identified by toxin in containers.

particularly interesting in view of the fact that in most of the containers which showed *toxin* the peas had been blanched.

It is also significant that half the cultures isolated from the uninoculated peas were Type A, and half (including those demonstrated by toxin production) Type B, while, as given in Table II, of the 14 containers showing toxin, 4 were Type A and 10 Type B.

A correlation can be seen between the types and strengths of the toxins and the methods of preparation and defrosting. Table VI shows such a correlation, including the findings with the inoculated materials. The predominance of Type B is striking.

CARDBOARD CONTAINERS

Results with peas packed in cardboard containers were interesting. There were only 48 of these, as none of this series was packed under a vacuum. The methods of preparation were exactly the same as used with the tin containers. Twelve per cent of the uninoculated cardboard containers became toxic. As in the tin containers, practically

TABLE VI

RELATION OF TYPE AND M.L.D. OF TOXINS IN TIN CONTAINERS TO INOCULATION AND METHODS OF PREPARATION AND DEFROSTING

Inoculation	Sample Number	Method of Preparation	Method of Defrosting	Toxin	
				Type	m.l.d.
None	22H	Blanched hot water	Cooked brine, room temp.*	B	1,000
	37G	" " "	" " " "	B	10
Dilute	23G	" " "	" " " "	B	500
	23H	" " "	" " " "	B	500
Concentrated	24G	" " "	" " " "	B	1,000
	24H	" " "	" " " "	B	1,000
	39G	" " "	" " " "	B	1,000
	39H	" " "	" " " "	B	100
	21G	Washed cold water	" " " "	B	500
	21H	" " "	" " " "	B	500
	21E	" " "	Room temp.	A	10
	21F	" " "	" "	A	10
Dilute	20H	" " "	Cooked brine, room temp.	A	100
	38G	Blanched hot water	" " " "	A	1,000

* See 5 c under "Conditions Studied."

⅓ of the toxins were produced by Type A cultures, and the rest by Type B. The results are summarized in Table VII.

Of the 16 uninoculated containers *Cl. botulinum* cultures were isolated from 3, and 2 became toxic. Thus, of 40 samples (in tin and

TABLE VII

BOTULINUS TOXIN AND CULTURES FOUND IN PEAS IN CARDBOARD BOXES

Total containers	Inoculation	Boxes Containing Botulinus Toxin			Boxes Containing Botulinus Spores	
		Number	Per cent	Type of Toxin	Number	Per cent
16	None	2	12.5	2 Type B	5	31.2
16	Dilute	2	12.5	2 Type A	9*	56.2*
16	Concentrated	5	31.2	1 Type A 4 " B	16*	100.0*
Totals 48		9	18.7	3 Type A 6 " B	30*	62.5*

* Presumptive.

cardboard containers) which had received no artificial inoculation, *Cl. botulinum* cultures were isolated from, or demonstrated in, 15, or 37.5 per cent.

Four methods of defrosting were used, the same as with the tin containers. No toxin was produced when the containers were defrosted and examined immediately, or when they were defrosted in the icebox and stored there for 3 days. This was true even when the peas had received a heavy inoculation of botulinus spores. When the peas were defrosted at room temperature, and allowed to stand for 3 days, toxins developed in 2 out of 4 uninoculated containers, and in 7 of the 12 tested by this method. Of the 12 which were first cooked in brine and then stored at room temperature, only 2 became toxic. These 2 had received the concentrated inoculum. The results are summarized in Table VIII.

TABLE VIII

NUMBER OF TOXIC CARDBOARD CONTAINERS OBTAINED UNDER EACH OF 4 METHODS OF DEFROSTING AND STORAGE

Total containers	Inoculation	Containers Defrosted by			
		Water bath at 110° F. Not held	Icebox held 3½ days	Room temperature held 3½ days	Water bath at 110° F. Brine cooked held Room temperature 3 days
16	None	0	0	2 (12.5%)	0
16	Dilute	0	0	2 (12.5%)	0
16	Concentrated	0	0	3 (18.7%)	2 (12.5%)
Totals 48		0	0	7 (14.5%)	2 (4.1%)

Determinations of the number of anaerobic bacteria as well as anaerobic spores were also made on all the cardboard containers. The results, together with the pH, method of defrosting, and demonstration of the botulinus organisms, are given in Table IX. As indicated, wherever possible the isolation of botulinus microörganisms was made from the tubes prepared for the determination of the numbers of spores. In this series of uninoculated containers, however, no botulinus-like growth was observed in the spore tubes. Therefore trans-

fers were made from the other series of tubes (those for the total anaerobic counts) wherever such was indicated by the proper growth. Five isolations of *Cl. botulinum* were made, 3 Type A, and 2 Type B.

TABLE IX

ANAEROBIC COUNTS, pH AND *Cl. botulinum* IN UNINOCULATED CARDBOARD CONTAINERS DEFROSTED BY EACH OF 4 METHODS

Sample No.	Method of Defrosting	Method of Preparation	pH	Bacterial Counts		*Cl. botulinum* Demonstrated	
				Anaerobes	Anaerobic spores	Dilution	Culture Type
10	A and B	Washed cold water	6.4	1,000	0	—	—
10			6.6	0	0	—	—
13		Blanched hot water	6.8	100	0	—	—
13			6.8	100	0	1–10*	A
10	C and D	Washed cold water	6.2	100	0	—	—
10			4.8	1,000	0	—	—
13		Blanched hot water	6.0	10,000	0	—	—
13			6.5	10,000,000	0	—	—
10	E and F	Washed cold water	4.8	10	0	1–10*	A
10			6.0	10	0	1–10*	A
13		Blanched hot water	5.0	1,000,000	10,000	1–1,000,000*	B
13			5.0	100,000,000	100,000	1–1,000,000*	B
10	G and H	Washed cold water	6.2	0	0	—	—
10			6.2	0	0	—	—
13		Blanched hot water	6.0	10,000,000	100,000	—	—
13			5.8	100,000,000	0	—	—

* Demonstrated in anaerobic count tubes, not spore count.

The connection between the types of botulinus cultures isolated and the methods of preparation and defrosting (Table X) is analogous to that noted in the tin container series, namely, that both A and B types occurred with about equal frequency, apparently independent of the method of defrosting and storage, but closely associated with blanching. The majority of Type A cultures were obtained from lots

which had only been washed in cold water, whereas most of the Type B were isolated from lots which had been washed in cold water and then blanched in hot water.

TABLE X

TYPES OF *Cl. botulinum* CULTURES OBTAINED FROM UNINOCULATED CARDBOARD CONTAINERS DEFROSTED BY VARIOUS METHODS

Sample Number	Method of Preparation	Method of Defrosting	Botulinus Cultures	
			Type	Dilution Count *
10E	Washed cold water	Room temperature	A	10
10F	" " "	" "	A	10
13B	Blanched hot water	Water bath 110° F.	A	10
13E	" " "	Room temperature	B	1,000,000
13F	" " "	" "	B	10

* These cultures were obtained from tubes of anaerobic count series, not from spore count series.

The data on the types and strengths of toxins in the cardboard containers (including the inoculated and the uninoculated) reveal further interesting information. Nine of the 48 containers showed toxin, 6 Type B, and 3 Type A. All the Type B toxins were produced in peas which had been blanched. These results are shown in Table XI.

TABLE XI

RELATION OF TYPE AND M.L.D. OF TOXINS IN CARDBOARD CONTAINERS TO INOCULATION AND METHODS OF PREPARATION AND DEFROSTING

Inoculation	Sample Number	Method of Preparation	Method of Defrosting	Toxin	
				Type	m.l.d.
None	13E	Blanched hot water	Room temperature	B	10
	13F	" " "	" "	B	125
Concentrated	15E	" " "	" "	B	500
	15F	" " "	" "	B	100
	15G	" " "	Cooked brine, room temp.*	B	100
	15H	" " "	" " " "	B	500
	12E	Washed cold water	Room temperature	A	2
Dilute	14E	Blanched hot water	" "	A	10
	14F	" " "	" "	A	50

* See 5 c under "Conditions Studied."

One interesting difference appears between the 2 types of containers. Leaving out of consideration the peas packed under a vacuum, we find that the toxins developed in the cardboard boxes were a little less potent than those in the tin containers.

SUMMARY

1. Twelve hundred containers of peas were prepared and frozen in Seattle, Wash., shipped to Washington, D. C., for study. The investigation included 4 types of containers, 3 methods of preparation, 3 degrees of inoculation, 2 methods of packing, and 4 methods of defrosting.

2. The peas, before freezing, were inoculated with buffer suspensions of dried *Cl. botulinum* spores. A mixture of 4 strains of *Cl. botulinum* (2 Type A and 2 Type B) was used.

3. All the peas were frozen in a cold storage room at 10° F.

4. The following determinations were made on each container:

a. Total anaerobic bacteria
b. Total anaerobic bacterial spores
c. Botulinus cultures isolated where possible from the uninoculated peas
d. H-ion concentration
e. Toxicity—Botulinus toxins, when present, identified in guinea pigs

5. Examination of 24 tin containers of uninoculated peas, most of which were held for 3 days after defrosting, showed 2 to be toxic. Eight others yielded botulinus cultures, 2 of which were obtained from samples examined immediately after being defrosted.

6. Examination of 24 tin containers of peas lightly inoculated, most of which were held for 3 days after defrosting, revealed that 4 were toxic.

7. Of 24 tin containers which had received a heavy inoculation, most of which had been held for 3 days after defrosting, 8 were toxic.

8. Of 16 cardboard containers which had received no inoculation and most of which had been held for 3 days after defrosting, 2 were toxic, and 3 others yielded botulinus cultures.

9. Of 16 cardboard containers which had received a light inoculation and most of which were held for 3 days after defrosting, 2 were toxic.

10. Of 16 cardboard containers which had received a heavy inoculation and most of which had been held for 3 days after defrosting, 5 contained toxin.

11. No toxin developed in peas which were examined immediately after defrosting, and none developed in those defrosted and held for 3 days in the icebox.

12. The contents of all the containers which showed toxin had been stored at room temperature and were badly spoiled when examined.

13. From the uninoculated peas (both types of containers) both Type A and Type B cultures of *Cl. botulinum* were isolated in approximately equal numbers, 8 Type A and 7 Type B.

14. Of the peas that were blanched and later became toxic (both types of containers), 3 showed Type A toxin whereas 14 showed Type B. Of the peas that became toxic after having been washed in cold water without blanching (both types of containers) 4 showed Type A toxin, and 2 Type B.

In the total of 23 toxic containers, 7 were Type A, and 16 Type B.

15. Of the total of 4 uninoculated samples which showed toxin, 2 were ob-

tained from the tin and 2 from the cardboard containers, and in both kinds of containers the peas had been blanched. The toxin in all 4 was Type B.

REFERENCES

1. Bigelow, W. D., and Esty, J. R. The Thermal Death Point in Relation to Time of Typical Thermophilic Organisms. *J. Infect. Dis.*, 27: 602–617 (Dec.), 1920.
2. Clark, William M. *The Determination of Hydrogen Ions*, 3d ed., 1928.
3. Dubovsky, B. J., and Meyer, K. F. The Distribution of Spores of *B. botulinus* in the United States. *J. Infect. Dis.*, 31: 541–599, 1922.

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Travels of Marco Polo

YARKAND is a province five days' journey in extent. The people follow the law of Mahommet, but there are also Nestorian and Jacobite Christians. They are subject to the same prince that I mentioned, the great Khan's nephew. They have plenty of everything, particularly of cotton. The inhabitants are also great craftsmen, but a large proportion of them have swollen legs, and great crops at the throat, which arises from some quality in their drinking water. As there is nothing else worth telling we may pass on."

In the prologue, it is related that the great knowledge and experience of "the world and its wonders" of the Polo brothers' travels of twenty-six years were reduced to writing as indicated by the following quotation:

"Now, being thereafter an inmate of the Prison at Genoa, he caused Messer Rusticiano of Pisa, who was in the said Prison likewise, to reduce the whole to writing; and this befell in the year 1298 from the birth of Jesus."

The travels by the Polo brothers (Marcus, Moffeo), sons of a nobleman from Venice, began from Constantinople in 1260, A.D.

This reference suggests the presence of some form of elephantiasis, and of goiter, with a definite diagnosis that the latter was due to the drinking water.—Grossett and Dunlap, New York. From *Universal Library*, p. 60, chapter 35.

Identification of Certain Funguses Pathogenic for Man*

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BLASTOMYCOSIS as reported in this country and elsewhere is a disease associated with yeast-like funguses as etiological agents. The term blastomyces is used in a general way to include a multiplicity of organisms, yeast-like in certain stages of their life cycle and under certain conditions, variously described by different investigators as saccharomyces, cryptococcus, monilia, oidium, torula, endomyces and coccidioides. It appears that the term blastomycosis was first used by Busse and later by Gilchrist to designate a skin disease associated with a fungus the identity of which they were not certain.

Since the work of Robin, 1853, a yeast-like fungus has been recognized as the cause of thrush, and these organisms have been described as the cause of vaginitis, bronchitis and certain skin diseases. Primary pulmonary infections have not been frequently observed until recently. From the tropical countries Castellani, Sen, Paramanand and Pijper have reported cases of bronchitis, and in this country Boggs and Pincoffs, Simon, Steinfield, Johns and Shaw have reported the isolation of yeast-like funguses from the sputum in cases of pneumonia, bronchitis, chronic bronchitis, and asthma. One of us (Stovall), 1928, reported 18 cases of primary infection of the lung with yeast-like fungus.

Concerning the identity of the organisms associated with these diseases there is considerable confusion. The reports indicate a wide variety of organisms which are so sensitive to environment as to defy certain identification. It has come to be believed that any one of these organisms may change its biochemical or cultural characteristics for no apparent reason. Thus it is not uncommon to find in the literature expressions like these: "Asci present but certain strains do not seem to be able to produce asci"; "the characteristics are very variable; some strains of this organism ferment saccharose and some do not." The reports as to the ability of certain of this group to coagulate milk or liquefy gelatin are also variable.

For the past 7 years we have been engaged in the study of the bio-

* Read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

FIGURE I—Malt agar colony. Type I Monilia

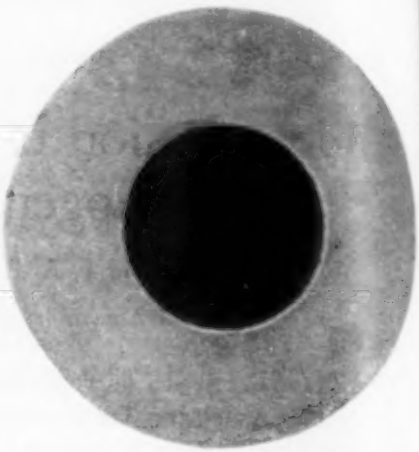

FIGURE II—Malt agar colony. Type II Monilia

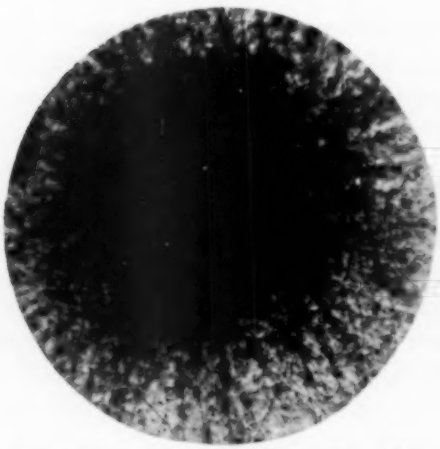

FIGURE III—Malt agar colony. Type III Monilia

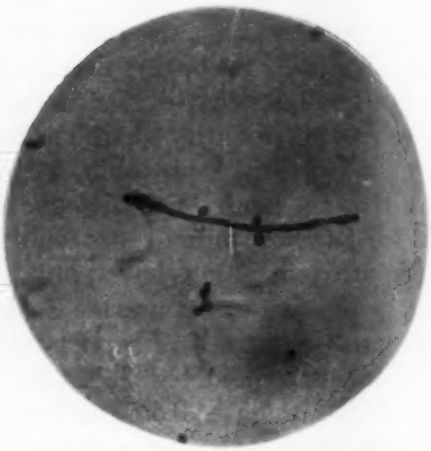

FIGURE IV—Monilia from culture

FIGURE V—Endomyces, culture showing asci

FIGURE VI—Saccharomyces, culture showing asci

TABLE I

SHOWING CULTURAL AND BIOCHEMICAL CHARACTERISTICS OF FUNGUS

	Glucose	Levulose	Mannose	Maltose	Galactose	Sucrose	Lactose	Inulin	Raffinose	Dextrin	Gelatin	Milk	Mycelial Colonies Malt Agar 48 hours
Monilia Type I	AG	AG	AG	A	A	A	O	O	O	O	O	O	+
Monilia Type II	AG	AG	AG	AG	AG	A	O	O	O	O	O	C	O
Monilia Type III	AG	AG	AG	AG	AG	AG	O	O	O	O	O	O	++
Endomyces	AG	AG	AG	O	AG	AG	AG	AG	AG	O	+	A	+
Saccharomyces	AG	AG	AG	AG	AG	AG	O	O	AG	O	O	O	O
Oidia	O	O	O	O	O	O	O	O	O	O	+	O	+ 12 days
Torula	A	A	A	O	A	A	O	O	O	O	**	O	O

chemical and cultural behavior of yeast-like fungus isolated from sputum in cases of pneumonia, bronchitis, asthma, and from cases of vaginitis, thrush, skin lesions and generalized infections. In 1929 we reported on 40 strains, and since have completed a study of over 200 cultures isolated by us and others obtained from the American Type Culture Collection. The methods employed have been described elsewhere.

Table I shows the result of the study of the 200 cultures isolated by us. The sugars used are indicated in the table. The results of the fermentation tests were read after incubation at 37° C. for 7 days. The colonies were described and illustrated (Figures I, II and III) at the end of 48 hours at 37° C.

The same malt agar plates used for the study of colony morphology were used to demonstrate the formation of asci. After the morphology of the colony had been observed at the end of 48 hours at 37° C., the plates were allowed to stand in the icebox or at room temperature until dry and hard—from 30 to 60 days. The dried growth was soaked off with sterile salt solution and again plated on malt agar and incubated at 37° C. Numerous asci could be demonstrated after 3 days.

Table II gives a description of the organisms secured from the American Type Culture Collection. Two of the monilia, *M. Albicans* and *M. Candida,* have been the subjects of controversy for a long time, and their characteristics variously described by different investigators.

TABLE II

SHOWING OUR IDENTITY OF ORGANISMS

Secured from American Type Culture Collection

	Glucose	Levulose	Mannose	Maltose	Galactose	Saccharose	Lactose	Inulin	Raffinose	Dextrin	Mycelial Colonies Malt Agar 48 hours	Gelatin	Milk
Type I Monilia													
Monilia Type I	AG	AG	AG	A	A	A	O	O	O	O	+	O	O
Type II Monilia													
Monilia Type II	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
212 *M. albicans* Craik	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
801 *M. richmondi* Shaw	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
2117 *M. psilosis* Ashfordi	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
752 *M. pinoyi* Castellani	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
753 *M. metalondinensis* Cast.	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
4021 *Monilia-Zillig*	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
4135 *M. pseudotropicalis* Castellani	AG	AG	AG	AG	AG	A	O	O	O	O	O	O	C
Type III Monilia													
Monilia Type III	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
2113 *M. candida* Bonorden	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
1369 *M. candida* Bonorden	AG	AG	AG	AG	AG	AG	O	O	O	O	++	O	O
750 *M. tropicalis* Castellani	AG	AG.	AG	AG	AG	AG	O	O	O	O	++	O	O
Endomyces													
748 *M. macedoniensis* Castellani	AG	AG	AG	O	AG	AG	O	AG	AG	O	+	O	O
Mycoderma													
749 *M. krusei* Castellani	AG^P	AG^P	AG^P	O	O	O	O	O	O	O	+	O	O

A = Acid, G = Gas, O = negative results, + = positive, C = Clot, P = Pellicle.

We secured organisms furnished by two of the most recent investigators, Castellani and Ashford. *M. Richmondi* Shaw and monilia from

Sprue-Zillig were added to give a wide variation of location and opinion by which to test our method of classification.

We have found monilia associated with lesions of mouth, thrush; vagina, vaginitis; and lung, bronchitis, bronchiectasis, asthma and pneumonia. We have encountered them much more frequently than any other organisms. One hundred and fifty of the 200 cultures isolated are some variety of monilia. They are separated from other mycelium producing yeast-like funguses by the size of the cells and mycelium, by the absence of asci and by their method of reproduction —budding and mycelium production. The mycelium is septate and lateral conidia form by budding near the joints of the hyphae, and terminal conidia by budding and constriction at the ends of the hyphae (Figure IV). They also ferment a variety of sugars.

The species within the genus are recognized by colony morphology after incubation for 48 hours on malt agar, by the fermentation of sugars and reaction in milk. Table III shows the different species of monilia which have occurred in our cultures. Instead of recognizing a large variety of species we have been able to classify all the cultures isolated as one or another of 3 species. This is in contrast to previous investigators, who, if they have worked with a large number of cultures, have described many different species in this genus. This multiplicity of species has often been attributed to the variability of the organism under apparently identical conditions. We have not found this to be true. Our cultures have maintained the same reactions after repeated observation over a period of 7 years. When variations have occurred a restudy or checking has revealed an error in technic.

Because our results have shown only 3 different species of monilia and because these results have been so constant, we have studied the organism obtained from the American Type Culture Collection described in Table II. This table indicates that all of these cultures are either one of 3 types of monilia, or because of fundamental biological differences belong to another genus of yeast-like fungus. An instance

TABLE III

SHOWING DIFFERENTIAL CHARACTERISTICS FOR THREE TYPES OF MONILIA

Species	Maltose	Saccharose	Milk	Mycelial Colonies
Type I	A	A	O	+
Type II (*M. albicans*)	AG	A	C	O
Type III (*M. candida*)	AG	AG	O	++

of this is *M. Krusei.* This organism is not a monilia but a mycoderma, because of the constant production of a pellicle when grown in the sugar mediums which it ferments. *M. Macedoniensis* Castellani has also been removed from the monilia group and placed in the class of endomyces by us, because asci have been observed repeatedly in this culture. *M. psilosis* Ashford as shown in the table gives constantly the reactions which we consider characteristic of *M. albicans.* Ashford has expressed the opinion that *M. psilosis* represents a single species and that it can be differentiated from *M. albicans.* He admits, however, that while all of his strains ferment maltose, there is a variability in their fermentation of saccharose. This we believe is evidence that *M. psilosis* represents a multiplicity of species, and that in the one instance when saccharose was fermented Ashford was dealing with *M. candida,* and in the other, saccharose not fermented, with *M. albicans.*

The differences between the 3 species of monilia which we have described is still further illustrated in Table IV. Nearly all investigators have described a variety of reactions for these organisms when grown in litmus milk, and some a variability in the same organism. However, a review of the literature shows a striking lack of uniformity in the technic. The length of incubation has varied and no attention has been paid to the reaction of the milk or the constancy of the calcium lactate content. It is well known that various specimens of milk vary in their pH and that autoclaving precipitates the calcium lactate. After this salt has been precipitated the milk cannot be coagulated by rennet and the degree of precipitation slows up the coagulating time of rennet. The failure to take these factors into consideration can explain the variability of these organisms, when grown in litmus milk, reported by many investigators.

In order to substantiate this point of view, we carried out experiments illustrated in Table IV. Skimmed milk tubed in 10 c.c. quantities was sterilized in the Arnold sterilizer at 100° C. for 30 minutes on 3 successive days. To one set of tubes 0.5 c.c. of 10 per cent sterile calcium lactate was added, pH 6.4; another was used as plain milk, pH 6.6; and a third to which NaOH was added to bring it to pH 7.0. The different sets of tubes were inoculated with 0.1 c.c. of a 48-hour glucose broth culture from cultures representative of the 3 species of monilia. This experiment was carried out with all cultures of the different species and with those obtained from the American Type Culture Collection. Table IV shows the reactions constantly observed over many months and in many tests. Whereas we had before experienced the difficulties of other investigators—variability of the reactions of these organisms when grown in litmus milk—we were now always

TABLE IV

SHOWING MILK REACTIONS OF MONILIA

Number and Name of Culture	Skimmed milk with 0.5 cc. 10% ca. lactate pH 6.4		Plain skimmed milk pH 6.6		Skimmed milk with NaOH pH 7.0	
	Coag. Time	pH at Coag.	Coag. Time	pH at Coag.	Coag. Time	pH at Coag.
Monilia Type I						
Monilia Type I	neg.	6.8	neg.	7.0	neg.	7.2
Monilia Type II						
Monilia Type II	3 da.	6.4	13 da.	6.8	neg.	7.0
2112 *M. albicans*	3 da.	6.4	12 da.	6.8	neg.	7.2
801 *M. Richmondi* Shaw	3 da.	6.4	13 da.	6.8	neg.	7.2
2117 *M. psilosis*	3 da.	6.4	10 da.	6.8	neg.	7.2
752 *M. pinoyi* Cast.	3 da.	6.4	12 da.	6.8	neg.	7.0
753 *M. metalondinensis* Cast.	3 da.	6.4	17 da.	6.8	neg.	7.2
4021 Monilia from Sprue-Zillig	3 da.	6.4	10 da.	6.6	neg.	7.2
4135 *M. pseudotropicalis* Cast.	3 da.	6.4	12 da.	6.8	neg.	7.0
Monilia Type III						
Monilia Type III	neg.	7.6	neg.	7.8	neg.	7.8
2113 *M. candida* Bon.	neg.	7.6	neg.	7.8	neg.	7.8
1369 *M. candida* Bon.	neg.	7.6	neg.	7.6	neg.	7.6
750 *M. tropicalis* Cast.	neg.	7.4	neg.	7.8	neg.	7.8

able to secure the same results and at an almost fixed incubation period. The reaction of the milk at the time of coagulation was determined by removing a small amount from the tube at the time of coagulation, or at the end of 3 weeks' incubation at 37° C., if coagulation had not taken place up to that time. This table shows that organisms in the same species behaved alike, and that the reaction and calcium lactate content corrected the variable results before observed.

The other organisms described in Table I we have not studied so

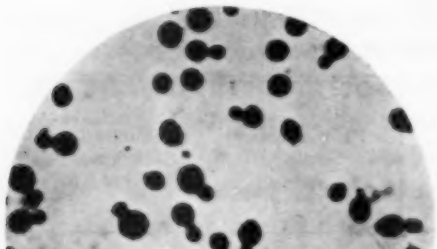

FIGURE VII—Torula—Culture

FIGURE VIII—Oidium—Culture

intensively. The figures in the plates illustrate the morphological differences of the various organisms. It will be observed that the endomyces is like monilia except that the former produces asci. The torula is similar to saccharomyces cerevisiae except that the latter produces asci and the former does not. The cultures of torula will produce abundant mycelium in sugar broth when left at room temperature 3 or 4 months. This is further evidence that uniformity of technic is an important factor in classifying these organisms.

The oidium described in Table I has the same morphological, cultural, and biochemical characteristics as the culture of *Oidium asteroides* Castellani, and the organism reported on by Gilchrist. Figure VIII shows the morphological differences between this organism and the others shown in the same plate. It has much coarser mycelium and a much larger spore with a double contoured wall. It does not ferment any sugar and in tissue never produces mycelium, but spores which are often seen in the giant cells (Figure IX). We have always isolated it from either skin lesions or sputum in cases suffering from a disease similar to that described by Gilchrist. It is our opinion that this is the organism

FIGURE IX—Oidium—In tissue, showing giant cell

which causes the typical blastomycosis described by Gilchrist, and that if the term blastomyces is to be used it should apply specifically to this organism.

SUMMARY

In our study of over 200 cultures of yeast-like funguses isolated from cases of thrush, bronchitis, asthma, pneumonia, vaginitis, and generalized infections we have encountered oidia (blastomyces), endomyces, torula, mycoderma and monilia. Of this group we have most frequently encountered monilia—150 out of 200 cultures. Our studies of these cultures and of cultures obtained from the American Type Culture Collection lead us to believe that probably there are only 3 species in this genus, 1 that does not ferment maltose, and 2 that do. Of the latter there are 2 varieties: 1 does not ferment saccharose, a type culture of which is *M. albicans;* the other ferments saccharose and is typified by *M. candida.* We have found the 3 species associated with thrush, vaginitis, bronchitis, etc. The characteristics of these organisms are constant when observed under identical environmental conditions and at stated periods of incubation. We believe that the reported variability of these organisms is due to a lack of uniformity in the technic of the investigators and not to the fickleness of the organisms.

REFERENCES

Ashford, Bailey K. Sprue, *Ann. Clin. Med.*, 4: 13–20, 1926.

The Rôle Played by Fungi in Sprue, *J. Trop. Med.*, 16: 33–35, 1913.

Castellani, Aldo. *Fungi and Fungous Diseases*, Chicago, 1929.

Stovall, W. D., and Bubolz, A. A. Forty Strains of Yeast-like Fungi Isolated from Sputum, *J. Infect. Dis.*, 45: 463–473, 1929.

Stovall, W. D., and Greeley, H. P. Bronchomycosis, *J. A. M. A.*, 91: 1346–1350, 1928.

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Monilias, Yeasts, and Cryptococci*

Their Pathogenicity, Classification, and Identification

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SIMPLE funguses reproducing by budding and apparently related to the yeasts have been found with regularity in thrush and tropical sprue, in cases of bronchitis, meningitis, and in a variety of lesions of the skin and its appendages. Similar forms also grow saprophytically on the skin and in the intestines.

In a previous study[1] of such yeast-like forms from thrush, sprue, and skin lesions it was found that certain simple morphological characteristics could be relied upon for grouping them. This morphological grouping could be confirmed by the agglutination method.

TYPES OF YEAST-LIKE ORGANISMS PARASITIC ON MAN

Most of the strains isolated from a series of cultures which now number several hundred can be classified under 8 types. Strains from oral thrush, intestinal sprue, and from moniliasis of the skin have appeared identical. This type will be referred to as *Monilia albicans*. Three other apparently distinct species of moniliae occur. One species of Saccharomyces and one of Willia have been found. In addition, strains are found which have been placed in the genera Cryptococcus or Mycoderma. These strains evidently include several species within each of these genera but no attempt has yet been made to differentiate them.

These types may be defined as follows:

Monilia albicans (Robin) Zoph.: Produces a definite mycelium made up of elongated cells which do not readily fall apart; reproduces by buds which accumulate in dense ball-like clusters along the mycelial threads. Globular thick walled chlamydospores are formed, no ascospores. An "inverted pine tree" forms in a gelatin stab. Ferments regularly dextrose, levulose, and maltose with the production of acid and gas. Varies in the reaction on galactose and saccharose. Giant colony, smooth and pasty at first, later convoluted at center, often showing small craters of ruptured gas bubbles. Agglutinates readily in serum produced against a known strain of *Monilia albicans*. Some cross-agglutination with other species.

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* Abstract of paper read before the Laboratory Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 14, 1931.

but readily separated from these by agglutinin absorption. Agglutinates to full titer in serum prepared against *Monilia candida*. Absorption not yet determined. Pathogenic for rabbits.

Monilia candida (Hansen): Similar in morphology to *Monilia albicans* but lacks the characteristic chlamydospores and spore clusters. Produces an atypical "pine tree" in gelatin. Ferments with the production of acid and gas, dextrose, levulose, maltose, and saccharose. Giant colony, membranous and more deeply convoluted than *Monilia albicans*. Cross-agglutinates to the complete titer with albicans serum. Absorption not yet determined. Non-pathogenic for rabbits.

Monilia parapsilosis (Ashford): Mycelium more fragile. No chlamydospores, no ascospores. Reproduces by budding. No spore clusters. Forms brush-like structure in gelatin. Ferments dextrose and levulose with the production of acid and gas, saccharose and galactose with the production of acid. Giant colony, pasty, surface smooth or wrinkled or honeycombed. Slight agglutination with albicans serum but separated by absorption. Non-pathogenic for rabbits.

Monilia Krusei (Castellani): Mycelium fragile, readily falls apart. Reproduces by elongated buds. No chlamydospores, no ascospores. Short fuzz in gelatin. Ferments levulose and dextrose with the production of acid and gas. Giant colony, flat and smooth. Only slight cross-agglutination with other forms. Readily identified on direct agglutination. Non-pathogenic for rabbits.

Mycoderma: Mycelium abundant. Reproduces by oidia or arthrospores, no ascospores. Forms which produce blastospores as well as arthrospores are here provisionally grouped with the mycodermas. Atypical "pine tree" in gelatin. No fermentation of sugars in strains studied. Giant colony rough, membranous, sometimes slight development of aerial mycelium in forms from feces, which is similar to *Oidium lactis*. Not possible to get a good suspension for agglutination. Non-pathogenic for rabbits.

Cryptococcus: No mycelium, budding forms only. No ascospores. Nail in gelatin. All strains so far studied ferment dextrose and levulose with formation of acid and gas; some ferment saccharose and raffinose; some produce acid but none gas in maltose. Giant colony, smooth and pasty, occasionally corrugated, similar in appearance to *M. albicans*, usually cream colored. Pink forms also included here. Cross-agglutinates with albicans, candida, and saccharomyces serums. Absorption not yet carried out. Non-pathogenic for rabbits.

Saccharomyces cerevisiae: No mycelium, occasionally chains of elongated cells. Reproduces by budding. Ascospores, 1 to 4 in an ascus. Nail in gelatin. Ferments dextrose, saccharose, maltose, and levulose with the production of acid and gas. Giant colony, flat, dry, often with slight radial ridges, brownish with age. Very slight cross-agglutination with monilia serum. Non-pathogenic for rabbits.

Willia anomala: Mycelium rudimentary or none. Reproduces by budding. Hat-shaped ascospores, 1 to 4 in an ascus. Nail in gelatin. Ferments dextrose, galactose, and levulose with the production of acid and gas. Colony flat, wrinkled, with radial ridges, dry with age. Cross-agglutinates in *Saccharomyces cerevisiae* serums but separated by agglutinin absorption. Non-pathogenic for rabbits.

CONCLUSIONS

Most of the yeast-like microörganisms found in diseased and on normal skin fall within a few species. These may be defined and recognized by their morphology when grown on suitable mediums.

The classification so obtained correlates almost completely with that obtained by absorption of agglutinins.

Direct agglutination is of aid in the recognition of these types. The gross colony characteristics and fermentation reactions are of interest but are often misleading unless studied in conjunction with the microscopic morphology and immune reactions. The relationships of these forms to other species, and hence their permanent botanical classification, cannot be determined on the basis of our present knowledge. Some agreement as to a provisional terminology is, however, necessary to avoid confusion.

One species, *Monilia albicans,* is pathogenic for the skin though it apparently occurs as a saprophyte in the alimentary tract. The other species described are probably non-pathogenic.

REFERENCE

1. A detailed study of these forms is to be found in the *J. Infect. Dis.*, 49: 183–215, 1931.

The Typhoid Carrier in New York State

AT the close of the year 1930 there were, exclusive of carriers in state institutions, 244 chronic typhoid carriers upstate under supervision. Only 5 of these were found to have been responsible for cases of typhoid fever during the year 1931, a total of 7 cases having been traced to them.

Thirty-one newly discovered chronic typhoid and 2 paratyphoid carriers were added to the department's list during 1931. Fifty-four of the cases of typhoid fever which occurred in 1931 were traced to 18 of these newly discovered carriers. . . . During the year 22 carriers were removed from the records. Of these 8 died, 5 were released after gallbladder operation and the submission of the required negative specimens, and 9 removed to other jurisdictions. . . . The total number of typhoid carriers on record January 1, 1932, was as follows:

Upstate New York (exclusive of state institutions)	262
State Institutions	22
New York City	275
Total	559

Of the 33 new carriers, 12 were discovered through the routine examination of release cultures, typhoid bacilli continuing to be present in the feces a year or more after date of onset of typhoid fever. Seventeen were discovered through routine investigation to determine source of infection of sporadic cases of typhoid fever. . . . Of the 33 new carriers, 23 were females and 10 were males. None of the carriers was under 10 years of age. One carrier, a male, was 10 years old and 1, a female, was 23 years old. Four were from 30 to 39 years of age; 4 from 40 to 49; 9 from 50 to 59; 10 from 60 to 69; and 3 from 70 to 79; 1, a male, was 89 years old.

Of the 33 carriers, 2 were cooks, 18 were housewives, 2 of whom lived on dairy farms and another maintained a tourist home and kept boarders. One was a dairy farmer, and 12 had occupations which did not involve the handling of food.—*Health News,* New York State Dept. of Health, Mar. 21, 1932.

What Constitutes Health Education in the High School*

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BY a slight change in the intonation of the title of this paper, "What constitutes health education in the High School" may be rendered as either the prelude to an affirmative statement or as the title of an inquiry.

It is my intention, however, to make this paper share in the nature of both an inquiry and an exposition: to question and to tell, the latter in a measure only, what constitutes health education in the high school.

Our inquiry must begin with the high school student. Before tackling the problem of the curriculum in health which should be followed in the high school we must know the nature of its students. Who are they? What is their number? What is their common social and economic position? What is the range of their intellectual capacities?

The answers to certain of these questions may be gathered from a study of the scholastic destinies and of the survival rates of the average 1,000 children entering grammar school.

According to the figures issued by the Education Office of the U. S. Department of the Interior, in 1928, the latest year for which statistics are available, of 1,000 entering the public school for the first time, 974 reach the 6th grade, 855 the 7th, and 768 the 8th and presumably graduate from public or grammar school.

Of the original 1,000, 610 enter high school, 438 reach the 2d year, 321 the 3d year, 268 the 4th year, and 260 are finally graduated from high school, of whom 160 enter college, and 50 are graduated.

To recapitulate, of 1,000 children entering public school, 14.5 per cent do not get beyond the 6th grade, 61 per cent enter high school, but only 26 per cent are graduated; 16 per cent of the original 1,000 or 61.5 per cent of those graduated from high school enter college, and 5 per cent of the 1,000, or roughly 20 per cent of those graduated from high school, also are graduated from college.

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There are approximately 4,250,000 high school students in the United States. Their common age range is 14 to 18 years. They come from, and will continue to constitute, the upper level of the middle class, economically, socially, and intellectually. They may be pictured as representing the hump of the distribution curve of our population; they are the high average.

The intellectual capacities of the high school student may be roughly gaged by his scholastic achievements. His social horizon, his social consciousness, may be assumed to be coextensive if not somewhat wider than that of the group from which he springs.

From a pragmatic viewpoint, therefore, and gaged by the standards current in our democratic nation, the high school group represents an important section of our population—one might almost say, the very backbone of our nation.

It is essential that we should fully appreciate the nature and sociologic position of the high school student, or else we may fall short in our efforts to serve him. The objectives of education being to fit the individual for effective adult life, we need to know the type of adult life which the high school adolescent has foreshadowed. Through such knowledge we may perhaps be better enabled to prepare him to his personal advantage, and to the vast benefit of the community.

We need also to know something of his psychologic stature. We must not approach him as if he were a passively receptive agent amenable to all our machinations. On the contrary, we must appreciate that he has aptitudes, interests, and preferences of his own, some of which are singular to him as an individual, and some characteristic of his age group.

All of these factors we must appreciate and take into account in formulating the answer to the query "What constitutes health education in the High Schools?" for we are not in a position to cut the garment from the whole cloth.

The foregoing is true of every educational approach, but particularly so in the instance of health education. To the factors enumerated there must be added another. The high school teacher of English, for example, knows with a substantial measure of certainty what training in grammar, spelling, composition, and reading the student who comes to him from public school has undergone. His own curriculum can be based on the preceding one and can thus form a continuity with it, but there is no such uniform training in health given to the public school pupil. In fact there is little certainty that the public school graduate has received any appreciable training in health in any form or of any sort. Witness of this may be found in

the widespread ignorance of, and indifference to, the fundamentals of personal hygiene prevalent among them, a condition which makes it necessary that the so-called health education in the high school should consist of campaigns or drives for clean teeth, proper food habits, the correction of constipation, skin hygiene, and the like, which properly belong to the curriculum of the lower 4 grades in public school.

One cannot therefore begin to formulate a program of health education in the high school without taking into account what training should be, but seldom is, given to the students in the public school, and I propose to set the stage, so to say, for the affirmative phase of our inquiry, by indicating what health knowledge and training the pupil entering high school is required to possess in order that an adequate and fitting program of health education may be possible in the high school.

To do this effectively we must divide the life of the student during his public and high school career into 3 periods, based on age and consequent attitudinal differences. The first period lasts roughly from 6 to 10, and takes in the first 4 grammar grades; the second includes the next 4 years, covering the remaining 4 grammar school grades, including at times what is termed junior high school; the third embraces the remaining years of the high school career.

If we divide our student body into 3 groups corresponding to these 3 age periods, we must at once perceive that these groups differ in their needs, in their psychologic attitude, and in their susceptibility to different pedagogic technics. The youngest group is more ready to accept authority. The middle group has the impelling curiosity of the adolescent. The high school group has a budding social consciousness which should be fostered and utilized for health education. The needs and capacities of these groups differ substantially. The youngest is more home-sheltered and less free in making its own choice than the older groups. Its interests are narrower, and its susceptibility to persuasion by science more limited. Its great need is for sound health habits contributing to growth and development. The elements of basic personal hygiene in terms of cleanliness, rest, exercise, outdoor play, and good feeding habits constitute the boundaries of its health interest.

Precept and repetition are effective pedagogic instruments applicable to this younger school group. The *ex-cathedra* statements on the basic needs of the growing child for proper food, rest, exercise and the like are acceptable to them on the authority of the teacher or parent. Scientific expositions beyond the barest simple facts are beyond their grasp and more often serve to confuse than to instruct.

There is little to be gained, for example, in drumming into the heads of children the term vitamins before they have a knowledge of the so-called mechanics of nutrition. They may be taught, parrot-wise, to repeat formulas, but like the parrot they speak without understanding. It is more profitable to confine health education within the immediate needs and grasp of children, and thus to hold and retain their interest and enthusiasm. They are responsive to the pedagogic technics which help build good health habits. Score cards, either personal or class, may be used without offending the nascent individuality of young children. The appeals of emulation, of belonging to the conforming group, of being approved of for doing the right thing, are stronger and more effective with younger children than with the older.

The first group then needs instruction and training in personal hygiene, in proper feeding habits, in cleanliness, in exercise and rest, and in kindred items. Personal hygiene as a cardinal theme in health education is proper in the first 4 grades. In the later periods it should hold a lower rank. If our work with the first age group has been properly done, it should not be necessary to dwell upon personal hygiene as such in the later classes. Some amplification and some modification of the early instruction will be required as the boys and girls grow older, but the groundwork will have been done in the first 4 years of school life.

The second age group, roughly from 10 to 14 years, differs radically from the first. It is less home-sheltered, less willing and less ready to accept without challenge the statement given on the "authority" of parent or teacher, more insistent upon being told why, and being convinced of the reasonableness thereof. The individual in this group exacts a larger measure of freedom in the choice of things, be it clothes, food or friends. He is also self-centered and curious to know about himself and his life. Life crowds in upon his consciousness and he craves enlightenment; he is eager to see the "works" of the machine.

Personal hygiene *per se* has little attraction for this intermediate group, but the construction and workings of the human body are its very meat. Health education should appreciate and meet the needs of this group. Biology, physics, chemistry, and history should converge to enlighten the adolescent on the wonders of the world and on the most interesting machine therein—the human body. In a dynamic, not static, fashion the structure and function of the human body should be taught, with as little insistence on minutiae and as much emphasis on the fundamentals as possible. The larger idea appeals to the young mind. The love of refinement and of details is the reward of maturity.

For instance, it is more important that the adolescent boy interested in the digestive system should know that it is a continuous pipe placed within the body cavity and that in it foods are mechanically and chemically broken down and prepared for absorption, than it is that he should have a knowledge of how to spell esophagus or jejunum. It is not to be understood that a knowledge of scientific terminology is to be disparaged. On the contrary the emphasis is rather on the value of "working knowledge." The first is desirable but this last is fundamental.

In the education of this group in health, the direction should be from the general to the specific, from the whole to the detail. Certain basic ideas on the human body need to be instilled into the consciousness of the young. They should understand that in the biologic sense the human body is a machine, and partakes of the nature of all machines in their subjection to certain universal laws of dynamics. Like all machines the human body does work, and transforms energy in the process. The study of physiology, in this sense, becomes a study of work methods, and that of anatomy a study of machine parts.

Through this method of approach the student may be given a "working knowledge" of the human body. Personal hygiene will of necessity enter into the study, since not only *how* the body works but *how it may work well* must be the theme. But, unlike in the early grades, personal hygiene will not be the primary subject, nor the authority of the teacher the basis for accepting the precepts. Conviction on the merits and value of the rules for proper living will come by the compulsion of scientifically derived conclusions. To this task should be devoted the last 4 years in grammar school, and possibly the first year in high school.

It is with such a training in health that the student entering high school should be equipped. Such training is the essential basis upon which a fitting curriculum in health education might be developed in the high school. Unfortunately, it is but rarely that we find such instruction in our public schools, and as a result our health education in high schools needs so frequently to be of the most rudimentary sort. The situation is truly preposterous; to appreciate it, imagine, by way of contrast, a high school student being taught spelling or the multiplication tables, and yet such is the approximate level of much of the high school health education.

I am leaving out of consideration all of the so-called health work which is carried on in the high schools, because I consider it more in the nature of service than of education. Many confound it with education, but it is no more instructive than any of the other common day

experiences. It is no doubt a distinct advantage to the boy to have his teeth repaired, his vision corrected, his posture improved, and his nutrition bettered, and, indeed, he may learn something about health during the process, but in its entirety this is health work, philanthropy if you please, but not health education. It is a paternalistic service which in a measure has been rendered necessary because we have failed to safeguard the child during its earlier development. It is cure made necessary by our failure to prevent the development of defects. I would not, if I could, put a stop to this work, but I am not willing to allow its inclusion under the heading of substantive health education.

The health education of the high school student should be projected on a higher and broader plane. Heretofore we taught health to the child purely in terms of himself. Now we must teach him to appreciate health in terms of the community and of the race as well. The health education of the grammar school was first made to serve the student's individual growth and development and later his understanding of the fundamentals of the human machine. Health education in the high school must teach the student to understand the nature of disease, disease prevention, and the meaning of health in terms of work, parenthood, and the performance of social and civic obligations.

The high school students differ essentially from their younger brothers and sisters; they are no longer boys and girls but young men and young women. The self-centered interest that served as the *vis a tergo* to his or her little realm has budded into a social consciousness which reaches out beyond the confines of home, school, and immediate family.

An intensified awareness of and interest in the opposite sex brings in its train a bloom of ambition. There is thought of job or profession. There is the deep desire to become a regular fellow, a successful person along the many lines of activity that characterize adult life, and above all there is in this stage of development much wondering as to the what, and how, and wherefore of social and communal life. The narrow interest in self of the childhood period has now been expanded into an interest in the relationship of the self to the rest of the mass. Health education must recognize this condition and utilize it for guidance in the construction of its curriculum and in the choice of its pedagogic technics.

There are aspects to both health education and to the larger health problem which transcend the individual, and have a meaning only when more than one individual is concerned. These aspects, these larger phases, should constitute the vital germ of the high school health education program. It is during this period that we have an oppor-

tunity, and also the obligation, to teach the young man and the young woman the significant health problems which deal with the home and the community, the hygiene of industry, and the health problems that come with adulthood, family life, children, etc.

What a grievous comment it is upon our educational program that many a young man and young woman graduate from our high schools with a tolerable knowledge of geography or of French, and with little or no knowledge of the care of children or the citizen's obligation to coöperate with his community health officers!

The young woman who within, say, 6 or 7 years will be a wife, and perhaps a mother, rarely receives in her high school period a knowledge of the rudiments of dietetics, which, if she but knew and could apply, would contribute so substantially to the maintenance of better health in our families.

The young man who is so soon to take his place in the shop or office receives but little information in the high school to enable him successfully to weather the industrial hazards and those of business environments.

Health education in the high school should take its cues from the realities of life facing young men and women, and be guided by these realities in determining the content of its curriculum. The young woman should understand how much of health depends upon the execution of the social health contract implied in social life; she should understand how the community safeguards its health through appointed health officers and legal ordinances; she should understand the health facts pertaining to motherhood; the basic facts of home care of infants and children should be made available to her; and there should be instilled into her a mental attitude that will enable her to profit by the expert medical knowledge that is available today. Dietetics, home sanitation, and home nursing should be included in her curriculum.

The young man should be taught as much, and in addition should be informed on industrial hazards, shop and office sanitation, and on those practices of personal hygiene, not excluding mental hygiene, which will serve to safeguard his health against the wear and tear of industrial and business life.

This is a large program, but if it be adequately distributed, and properly injected, as it belongs, into the formal studies which today constitute the high school curriculum, it can be executed without undue burden.

What does the high school student study today? Literature, mathematics, science, history, language, civics, biology, hygiene. He also receives a certain amount of physical training. Cannot history be

utilized to teach health? cannot civics include a proper description of the health aspects of communal life? What better end can science serve than to acquaint young men and women with the facts on dietetics, home, shop and office sanitation, and the like? Literature certainly ought to lend itself to health education, and even mathematics could be utilized to the same end.

There has long been a struggle among educators as to the precise meaning of "education." Some have been for the classical tradition, some for the utilitarian. I should loath to subscribe to that extreme utilitarian viewpoint of education enunciated, say, by Spencer, but we must all agree that if education fails to equip the growing boy or girl with the instruments of understanding which will enable him and her to function usefully and to survive, education itself is a failure, and who can deny that health is basic to both useful function and survival?

Though the temptation has been great, I have abstained from composing and presenting to you a detailed plan of health studies. By my understanding of the theme of this discussion, I have felt myself commissioned to analyze and set up criterions on the basis of which it would be possible to organize a detailed plan of study in any high school, and which would fit and allow for any peculiar local situations.

I should like, however, to sketch briefly the major concrete divisions of a plan of studies in health for a high school:

In the first year, corresponding with the junior high school grade, the student's knowledge of the structure and function of the human body should be rounded out. This knowledge need not be detailed and static, but general and dynamic. Even if the student is lacking in the fundamentals, by devoting 2 hours a week for a year it is possible to equip him with a knowledge of the essentials. This phase of the curriculum has been developed in detail.[1]

The second year should be largely devoted to developing a knowledge of disease processes and the means at our command for their avoidance and treatment. Such a study should begin with the general consideration of noxious agents, including germs. The manner in which toxic substances, including bacterial products, injure the body should be made clear. Subsequently, the defensive agents both without and within the body should be detailed; immunological agents such as vaccines, antitoxin, immune serums, and their uses might then be appropriately considered.

In the third year specific diseases should be studied, including those of childhood and their complications, tuberculosis, the venereal, and the degenerative diseases.

In the fourth year home and shop sanitation, home nursing, and

the hygiene, both physical and psychologic, of children, are proper subjects.

Mental hygiene as applicable to the student's person, and as a part of communal existence should be insinuated into the studies during the 4 years. In the last 2 years, special attention should be paid to the problems of work, of love and familial relations, and of friends and communal relations.

As a pedagogic technic the historical approach is particularly effective. It initiates the young into the adult group. It enables them to appreciate their heritage, and the traditions behind them. It serves to enthuse them. By dealing with the history of the development of hygiene, our knowledge of disease and disease prevention, of psychology and mental hygiene, the student is enabled to see in a large way what has gone before, he learns much of the substance of science and, best of all, he has a goal set before him.

REFERENCE

1. Galdston, Iago. *Health Education in Teachers' Training Schools.* Report on a five-year study at the New York Training School for Teachers. Published by New York Tuberculosis and Health Assn., New York.

Judging the Efficiency of the Enforcement of Sanitary Milk Regulations*

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THE desire to measure efficiency and progress in any field of endeavor is a commendable characteristic of human nature. These two terms are relative, and different fields of endeavor differ widely in the extent to which efficiency and progress can be measured and expressed concretely.

Much depends upon what our interest is, in attempting to make such measurements. We may be interested primarily in the objective or tangible elements where measurements, expressed in mathematical terms, are usually possible—for instance, the number of miles of improved streets and the like in a given city. Or we may be interested primarily in the subjective or intangible elements where measurements are more difficult, if not impossible—for instance, the degree of illiteracy or of healthfulness among the inhabitants. We find, however, the objective and subjective combined in almost every field, and many people are naturally interested in the evidences of progress in both. The chief danger lies, however, in assuming that the subjective can be satisfactorily measured in terms of the objective.

In the field of sanitary milk control we are confronted with both: the objective, consisting of those tangible, visible and more or less easily measurable items that are recognized as necessary or in many cases desirable in milk production and distribution; and the subjective, consisting of the intangible, and more or less immeasurable end-result —a high quality, safe, palatable product. Any attempt to show progress in the first aspect alone, yields information of unmistakable value only regarding the general status of the conditions surrounding the production and handling of milk. Any attempt to show progress in the second, namely, quality, is commendable but is fraught with many uncertainties. Some of those factors that combine to make up quality are impossible of measurement; the others are, more or less, difficult to measure. With few exceptions, none bear any very close

* Read at a Joint Session of the Laboratory and Food, Drugs and Nutrition Sections of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

relation to the factors that combine to make up what we may consider as those desirable conditions which merely facilitate the production of quality. The ultimate end-result in milk control in many respects falls little short of being as intangible as that in the field of education, for instance, and is almost as difficult to measure and express in understandable terms. Any attempt to express quality of milk in terms of barns or milk plants is equally as unconvincing and illogical as to express the degree to which a student mastered the subject in hand, in terms of the classroom. All through the history of milk control attempts have been made to devise some method of showing progress, but none has proved convincing, probably because the originators not only failed to appreciate the inherent difficulties but also because they erred in thinking that because a proposed scheme appeared to be logical it must accurately portray the true conditions.

Shortly after 1900, for example, there was unanimous agreement that some mathematical scheme of rating milk control would greatly facilitate the work of health departments. At that time the erroneous theory that disease emanated from the surroundings still had a firm grip upon the prevailing conception of disease relationships; consequently all milk control was directed at the milk producer on the farm. It was felt that if the conditions surrounding production could be sufficiently improved, the problem would be solved. The idea was proposed that there should be some mathematical means of rating dairy barns. It was reasoned that such a rating would stimulate the producer to improve his conditions in competition with his neighbor and that these ratings would also serve as valuable office records for comparing one barn with another or for measuring progress in control. To meet this universally recognized need, the familiar numerical dairy barn score card was devised in 1904 to 1906 and played an important rôle in milk control procedures, particularly during the next decade or so.

The merits of the dairy barn score card were broadcast everywhere. This new method was seized upon enthusiastically by almost everyone. It furnished a mass of figures which appeared logical. So great was the faith in this innovation that control officials finally agreed upon different dairy score limits as a means by which different grades of milk could be defined. In other words, the higher the barn score the higher the quality of milk. It was at this point in the history of control that the original intent of the scoring method was officially perverted. There can be no denying the statement, however, that this method of rating dairies was an outstanding step ahead in bettering milk supplies in general. It had real educational value, and in spite of the fact that

many nonessential items were specified, there were being instituted, as a result, better practices in the handling of milk.

Interest in the numerical dairy barn score has shown unmistakable evidence of decline; particularly during the last 10 years. The reasons are clear and need no detailed elaboration. The producers' and consumers' conception of quality was and still is based upon factors that were a part of the milk itself—flavor, keeping quality, cleanliness and cream line. The conception of quality as held by control officials was and still is confined largely to factors related to public health, sanitation and the like. The dairy barn score in no way expressed either conception. It was the barn that was being rated and not the milk which the consumer purchased.

If a method of scoring anything could be devised that would, at least with a reasonable degree of accuracy, correspond to the public's conception of the thing being scored, then doubtless such a scoring method would be successful. There are certain inherent difficulties, however, which should be kept in mind. For instance, we might score all of the kitchens in a given city and secure data that would be interesting and doubtless instructive, but how many housekeepers would be concerned over the fact that a neighbor's kitchen scored 5 points higher because of an extra window? Then suppose some group of officials—following the precedent established during the first decade of this century in milk control—tried to maintain that the higher the score of the kitchen the better the meals prepared therein. The reaction that would follow is so obvious as to need no comment. Under any present-day plan of rating milk supplies, why should the inhabitants of Podunk be concerned because their milk supply rated 65 per cent while that of Squedunk rated 75 per cent, due to the greater emphasis in the enforcement of certain items which may or may not have had any sanitary significance?

When it comes to comparing the efficiency of the enforcement of sanitary milk regulations, we are confronted with almost insurmountable difficulties. The human element plays such a prominent part. Any group of individuals, for example, might visit a number of dairy barns or milk plants and in general agree that some were absolutely unfit places in which to handle milk, some fair, and some highly satisfactory. But just as soon as they should attempt to express their observations in terms of numerical ratings based upon various items, then the question of the relative importance of the various items would come up. Such decisions are difficult because of differences in opinion and in the end are arrived at arbitrarily. Most well thought out schemes fail to interest the public which does not see the barns that have been

white-washed, or the lack of cement floors, or even the method of cooling or of sterilization and the like. Herein lies one fundamental difficulty in arousing public interest in any rating scheme designed to express progress in milk control.

Wherever the economic aspects in any field are rendered as complex by public health matters as they are in that of milk control, it should be remembered that any attempt to measure progress, is very apt to confront the milk producing and consuming public with questions that prove confusing and which not infrequently entail more or less needless expense. The fact that the average investment per farm dairy throughout the United States is only about $3,000 (at 6 per cent this allows a yearly income of $180), indicates some of the real, fundamental limitations. The tendency for too many control officials is to allow their enthusiasm to overrule their judgment and, knowing subconsciously that their position of authority discourages challenge, they are prone to heap upon the shoulders of the milk producer and distributor requirements which have no demonstrable sanitary significance under the claim of potential, public health significance. The inclusion of too many requirements of this nature is in itself bound to lead one astray, even when the most seemingly logical plan of rating progress in milk control is employed.

Some of the difficulties so sure to be encountered in attempting to show, mathematically, progress in milk control by a plan in which is combined both the more or less immeasurable subjective and the measurable objective, is illustrated in the following summary of surveys published in 1930.

> Before the adoption of the Standard Milk Ordinance (which occurred in 1923) the raw and pasteurized milk supplies of 152 southern municipalities were about equal in average public health quality to the *present* raw and pasteurized milk supplies of the 183 non-standard ordinance municipalities represented in this survey.
>
> As a result of the adoption of the Standard Milk Ordinance the raw milk of the same 152 municipalities now has a rating of 91 per cent compliance with Grade "A" Raw Milk requirements compared with a rating of 65 per cent for the raw milk supplies of the 183 non-standard ordinance municipalities included in this survey. This represents a superiority of 40 per cent.

This quotation is cited with the sole thought of focusing attention upon some of the pitfalls into which one may be unwittingly led.

Having in mind the rapid increase in the amount of milk being pasteurized, tuberculosis control among cattle, improvements in construction, and in cooling, sterilization facilities, and the like, it is hard to believe that, after 30 years or more of control involving the expenditure of vast sums of public funds, the "public health quality" of

183 northern city milk supplies is no better than that of the 152 southern city supplies. To one who has made an intensive study of milk control policies, who is not committed to any particular ordinance or control policy, and who has seen in every section of the United States all kinds of dairy farms and milk plant conditions—good, bad and indifferent—the following questions are naturally suggested: Is there any conclusive proof to show that the milk supplies of these 183 northern cities are *actually* less safe, more dirty, poorer in flavor, keeping quality or in food value, than the 152 southern supplies? Are the general conditions surrounding production on the farms and handling in the plant less satisfactory? Is this difference, if any, significant? and how is the significance to be proved? Is it not possible that a similar survey, in which the "yardstick" used was based upon the New York State Sanitary Code requirements for Grade A raw instead of upon the Standard Ordinance, would have shown the milk supplies of New York State cities to be, at least, equal in "public health quality," or perhaps even superior to those of southern cities? Viewing the problem of measuring progress in sanitary milk control from the point of view of the scientist, how are we to know whose "yardstick" is the correct one? Every ordinance written has been based upon the opinion of recognized authorities, and how are we to prove which group is or was the more nearly correct? It is unfortunate that the term "public health quality" was used, because in these surveys it was merely the degree of compliance with the requirements for Grade A milk, as defined in the Sanitary Code, that was being compared.

In another statement in this report is the implication that, as a result of enforcement the consumption of milk in these 152 standard ordinance municipalities increased 21 per cent. Extreme caution should be exercised in drawing any conclusions from data of this nature. According to data recently collected in our own department, the consumption of milk increased over the same period in the State of New York 31 per cent. If "quality" played an important part in increasing the consumption of milk in the south, how is this increase in consumption in the north to be explained?

Efficiency in milk control like the factor of safety in milk supplies, is purely relative. We may have our opinions as to the degree of efficiency in control or of safety in milk, or of the efficiency of any public school system, but when it comes to expressing efficiency in such fields in mathematical terms, we are immediately confronted with a maze of factors, some of which are more or less impossible of measurement, and the significance of some of which is merely a matter of personal opinion.

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LIFE MEMBERSHIP

LAST fall the Committee on Fellowship and Membership started a campaign to induce those in our membership who were qualified to do so to take out Life Membership in our Association. The financial depression made it a bad year for such an undertaking. Nevertheless, the movement has been highly successful, so that we wish once more to bring to the attention of our readers the advantages of taking this step.

On the part of the Association it means a permanent fund from which interest is drawn, thus supplying an income upon which we can depend. It means a decided diminution in fluctuation of membership, which in turn implies a unified body of public health workers upon whom the officers of the Association can count for advice and assistance. It means that we can predict our expenses from year to year with a greater degree of accuracy and an actual saving of office work in that there are fewer bills to be sent out at the beginning of the year, as well as follow-up letters for those who fall in arrears through oversight or for any other reason. A large body of Life Members will give a solidarity and permanence to our organization which can be obtained in no other way.

On the part of members, it means the saving of the annoyance of a bill at the first of the year when so many other dues become payable. For a large majority of our members, it means an actual saving, since

$100 paid within the course of any given year makes them exempt from payment of dues during the remainder of their lives and assures their membership in the Association. Under the present laws the fee may be deducted from their income tax.

Let us all remember that while it may be hard during a period of depression to pay out $100, this amount can be remitted in small sums at intervals during a whole year. Only those who have experienced the relief of not having a lot of bills for dues to societies come in on January 1 and each month thereafter can appreciate what it means to be free of them.

The committee have set a goal of 500 Life Members and they are much gratified to see the figure rapidly mounting since the Montreal meeting toward the first hundred. This is an increase of almost 100 per cent over the previous 4 years.

For our own good as well as for the benefit of the Association, to which we owe so much, and to which we are all so devoted, let us make an effort and greatly increase the number of Life Memberships.

WHAT IS KNOWN ON VITAMIN B DEFICIENCY

TWO laboratories have now announced the isolation of vitamin B (B_1) in pure form, Dr. B. C. P. Jansen in Holland, and Dr. Windaus in Germany. The products they describe, however, differ in chemical composition and in physiological activity. Jansen, who first published his method in 1927, has a crystal which contains carbon, hydrogen, nitrogen, and oxygen and is protective against polyneuritis in test rats with a dosage of 0.015 mg. per day. Dr. Windaus's product contains sulphur in addition to the elements reported by Jansen, and is said to be three times as potent.

These discoveries indicate important progress toward chemical identification even though the discrepancies suggest that the goal is not yet attained.

We need more data on vitamin B. Since 1926–1927 when the late Dr. Goldberger and his colleagues first showed that the water-soluble vitamin B of McCollum's nomenclature contained at least two distinct vitamins (now called vitamins B or B_1, and G or B_2) it has become important to delimit the physiological effect of each and their distribution in common foodstuffs.

Water-soluble B is widely distributed in natural foods. When the foods are assayed to determine their relative content of B and G it develops that whole cereals and yeast are rich in B, and relatively lower in G content. Milk, fruits, and vegetables on the contrary have

proved generally richer in G than in B. This fact has led Dr. McCollum recently to comment on the value of his "protective foods" as G supplements to a high cereal diet. The assays, however, also indicate that the B_1 content of the ordinary varied diet may not be as rich in B_1 as we have assumed on the old water-soluble B assay basis.

Dr. McCarrison was the first to suggest the rôle of B_1 in diet and his views have been summarized by Sherman[1] as follows:

B_1 deficiency may result in

1. Impairment of the neuro-muscular control of the bowels
2. Impaired transport of intestinal contents along the canal
3. Impairment of assimilative power
4. Impairment of secretory function
5. Impairment of protective resources leading first to mucous membrane infection and hence to systemic infection

Its relation to anorexia was established by Karr and Cowgill.

More recent work confirms its importance in the regulation of gastrointestinal function and certain types of constipation and colitis.

Such importance as is indicated by the above list need not, however, occasion alarm as to dietary inadequacy in this factor. Acute deficiency in the average American dietary would be rare. Partial deficiency or sub-optimal conditions are probably more common and suggest attention. In the study of these sub-optimal cases the newer discoveries and products promise valuable aid to the clinician and laboratory workers.

REFERENCE

1. Sherman, H. C., and Smith, S. L. *The Vitamins* (Rev. ed.), 1931.

RECORD FORMS

RECORDS for health department service have heretofore been developed by individual cities to meet their individual needs. Lack of uniformity of information and interpretation of services rendered was inevitable. With the rapid growth of health work, the general acceptance of the *Appraisal Form* and the interest shown in the Interchamber Health Contest of the National Chamber of Commerce by many of the smaller cities, a demand arose that this condition be remedied.

The forms prepared by the Sub-committee on Record Forms of the A. P. H. A., and now for sale, meet the situation. The needs of the smaller city were kept foremost in mind, a uniform nomenclature and code was adopted, following those believed to be the most universally accepted.

The records drafted demand a minimum of notation, ask no irrelevant questions, and yet contain essentials for the maintenance of service. Standard sizes were adopted to fit standard filing systems and to eliminate waste. In the development of each record, it was referred to active workers in the field for criticism and suggestion. Each record has had actual use in the field and should be satisfactory under most conditions.

Adoption of the records places in the hands of the health officer a means of obtaining facts which will assure him that his department is functioning properly, will point out needed lines of development, and will also be a means of obtaining facts to meet the forces that demand a curtailment in health service.

LETTER TO THE EDITOR

TO THE EDITOR:

On March 19, an Associated Press release was given rather wide publicity throughout the country, quoting me on the "economy budget" of the Chicago Board of Health.

Unfortunately, the reporter's version of the interview contained several statements and implications not in accord with my views and, in my opinion, not consistent with sound public health policy.

Realizing that the article as a whole may prove embarrassing to health officers in other localities, I desire to correct certain of these erroneous impressions and make my position clear in the matter.

The implication that I favor curtailment of present health budgets generally as wasteful or extravagant is a perversion of my statement that health departments unavoidably facing shrinkage of income should curtail at the expense of the less important functions, particularly the refinements of hygiene and sanitation and those activities affecting personal comfort rather than health.

I believe that fundamental health protection should be maintained and even augmented at all costs—during times of economic stress.

My statement in regard to politics in boards of health was simply that, unfortunately, politics does control in some localities and, therefore, has to be reckoned with.

In Chicago we have succeeded in pruning about $500,000 from our health budget, without grave impairment of essential lines of health protection. We have even provided for increased nursing service, and we have done this largely at the expense of the clerical service and the less important sanitary inspection having to do primarily with the esthetic. This was done in connection with a complete reorganization of personnel.

We are not advocating such cuts—in fact, we deplore their necessity—but we believe that in Chicago we shall be able to carry on the primary essentials, for the time being, without risk to public health.

I feel that health authorities are entitled to some reassurance regarding this interview, and should have available a corrected statement for use in counteracting unfavorable reactions affecting their own budgets.

HERMAN N. BUNDESEN, M.D.,
Commissioner, President, Board of Health, Chicago

UNITED STATES CAPITOL—Construction of the hall of the House of Representatives was begun ten years before the first gun was fired in the Civil War, and the Senate chamber wing was started soon afterward. The Capitol is 751 feet long, contains a total of 431 rooms and the cost of construction was $14,550,000. The Capitol is one of the many old buildings of Washington, and an outstanding example of good architecture. The Corinthian order is used in the external embellishment of the building. Its location "on the hill" is superb and it is one of the most impressive buildings in Washington.

NEW WASHINGTON

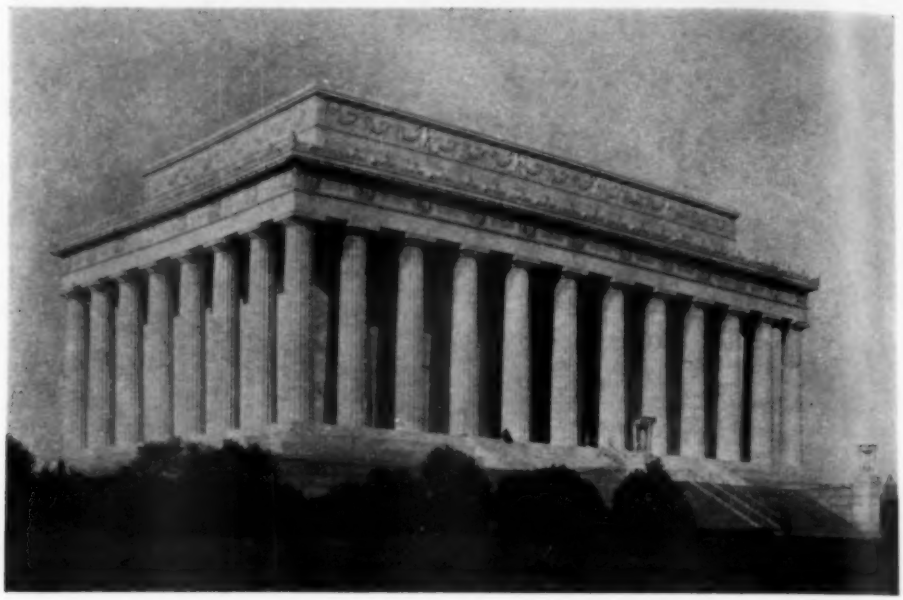
WILLIAM DE KLEINE, M. D., F. A. P. H. A.

American Red Cross, Washington, D. C.

VISITORS who come to the national capital will be immediately attracted by one of the most interesting and stupendous projects in public improvement construction work ever witnessed in this country. A $250,000,000 program of beautifying the city and of erecting commodious buildings to house departments of government is now in progress. Beautiful parks and landscapes with reflecting pools and sparkling fountains; magnificent, massive and monumental buildings—some just completed and others under construction—will greet the eyes of visitors. Those who have not been in the city for a year or more will be surprised and thrilled by this spectacular development that is destined to make Washington one of the most attractive of all the world capitals.

Those entering the city through the Union Station will see the new Capitol-Union Station Plaza development, which enlarges and beautifies the Capitol grounds. Half way between the Union Station and the Capitol is a new reflecting pool in which is mirrored the dome of the Capitol, and there is also a new fountain.

Facing the Capitol, as a companion building to the magnificent Library of Congress—the largest of its kind in the world—there is under construction the



LINCOLN MEMORIAL—The Lincoln Memorial was designed by Henry Bacon and was erected at a cost of $2,000,000. It was dedicated on Memorial Day, 1922, by William Howard Taft. The memorial is on a circular terrace 1,000 feet in diameter. Stretching to the east of the classic structure are large reflecting pools which mirror the memorial and also Washington Monument nearby. The memorial is a classic Grecian structure with a main hall 70 feet by 60 feet. There is a colossal statue of Lincoln seated in a chair. It was carved from Georgia marble.

new Supreme Court Building which will cost approximately $15,000,000. Close neighbor to this is the artistic Folger Memorial Library, in which is treasured the matchless Shakespeariana Collection. This is a most artistic building costing $10,000,000—a new child in Washington's family of magnificent edifices. This library was founded as a repository of rare editions and literary treasures, rather than for the circulation of books. It contains 75,000 volumes collected by Henry Clay Folger during the last five decades of his life. What Mr. Folger himself called "the most precious book in the world," with some 350 other specially valuable volumes, was brought from New York to Washington in an armored car with five guards. This book is the Vincent first folio of 1623, containing the earliest printed version of some of the plays included in the Shakespeare canon. Another collection of outstanding value is the poems including "Venus and Adonis" printed in 1599 and valued at $75,000.

Visitors who heretofore have been whisked away from the Union Station along unpretentious side streets may now approach the heart of the city along a broad new avenue, leading to Pennsylvania Avenue, which is the historic parade ground of the nation. This new avenue goes within two or three blocks of another elaborate development just west of the Capitol—the old Botanic Garden with its up-to-date conservatory, lecture, and exhibition rooms. It also leads to the Mall, which is a large triangular area south of Pennsylvania Avenue extending from the Capitol to the Lincoln Memorial.

The Mall was originally laid out by George Washington and Major L'Enfant as a great central garden for the city of Washington. This area is now being redeemed by the federal government and gradually transformed into beautiful

parks and gardens. Old buildings have been removed and new ones are under construction. What was formerly B Street from the Lincoln Memorial past the Capitol has been straightened, widened and renamed Constitution Avenue. This beautiful avenue connects the Capitol with the New Arlington Memorial Bridge, the new Washington Memorial Highway and Arlington National Cemetery.

Where Constitution Avenue and the new Louisiana Avenue from the Union Station meet Pennsylvania Avenue across the Mall, there has been created "Union Square" as a cross axis of the Mall. This is graced by another beautiful mirror basin comparable with the one between the Washington Monument and the Lincoln Memorial.

Facing the Union Square from the north, visitors may see rising what is designed to be the most magnificent municipal center in the country. It will occupy four large city squares. It lies directly south of the original Municipal Building, now occupied by the Supreme Court of the District of Columbia.

Across the Mall to the south another large group of government buildings is being erected for the War and Navy Departments. In that part of the Mall triangle, between the Capitol and the U. S. Treasury building, is rising an imposing group of buildings which constitutes one gigantic conception of utility and beauty. Within these buildings will be housed many of the departments of government which for year have been kept in rented quarters and temporary buildings.

One of the greatest new buildings—the Department of Commerce—gracing this triangular area, has been completed and is now occupied. The plans for it

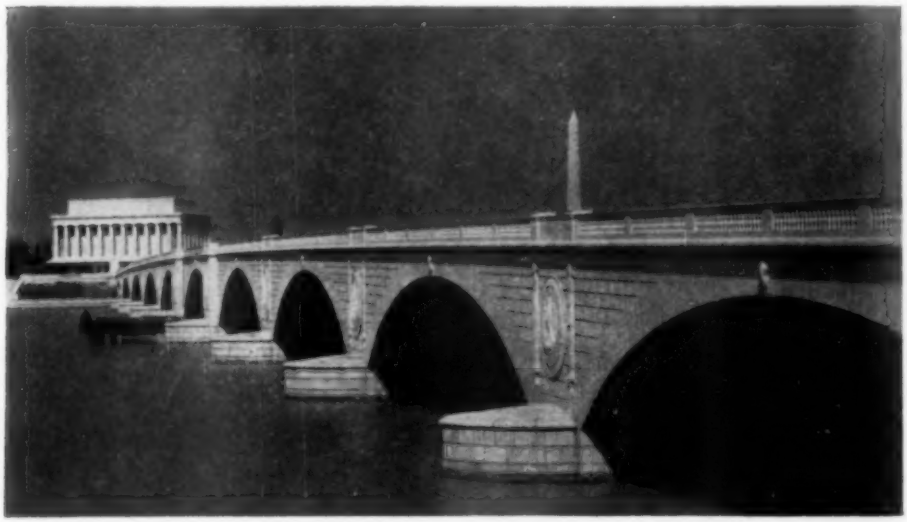
NATIONAL ACADEMY OF SCIENCES—The National Academy of Sciences, with its pools and gardens, was designed by Bertram G. Goodhue as a portion of the surroundings of the Lincoln Memorial. It is the place where sightseers may view sunspots and instruments for measuring the almost immeasurable. It represents pure science in the discovery of facts destined to become useful.

were laid when President Hoover was the Secretary of Commerce. He also laid the corner stone. The building is longer than the Capitol and cost about $17,500,000. Its basement is said to be large enough to store three of the largest ocean liners.

Another great federal structure under way, in which delegates of the American Public Health Association convention will be particularly interested, is the new marble building for the U. S. Public Health Service. It is located on Constitution Avenue not far from the Lincoln Memorial. This building will be ready for occupancy the latter part of 1932 or early 1933. Public health leaders over the entire country will be glad to know that the U. S. Public Health Service will soon come into its own, after having been housed in inadequate quarters for so many years. The recent expansion of the work of the Hygienic Laboratory, now the National Institute of Health, is another milestone in the progress of public health service and a recognition of its significance in our national and community life.

A close neighbor to the White House is another group of three artistically designed buildings, occupying an entire city square—the headquarters of the American National Red Cross. The last one of this group has been completed and will be occupied in July. The buildings are all of white marble in Grecian style. When the landscaping has been completed and the final touch of the artist applied, this square will be one of the beauty spots in Washington.

A great coördinated development including the Arlington Memorial Bridge, spanning the Potomac, and the Memorial Highway from Washington to Mount Vernon, has recently been completed. This development is intended as an outstanding tribute to George Washington. The bridge is said to be the largest draw-bridge in the world. Huge electric motors operate the two



ARLINGTON BRIDGE—This development has been carried out as a tribute to George Washington. The bridge is 2,150 feet long and cost $7,000,000. The Arlington Memorial Bridge is said to be the largest draw bridge in the world and the draw opens and closes in 5 minutes. The bridge runs into the new Mount Vernon Highway, said to be the finest piece of roadway construction in the world. With the completion of this roadway, the dream of statesmen for nearly a century has at last been realized.

ponderous 6,000-ton jaws of the draw. The bridge has nine segmental arches of 166-feet span at the ends, and spreads gradually to 184 feet in the central arch. It is 90 feet wide including sidewalks. This makes it almost the width of Fifth Avenue, New York.

The Memorial Highway, stretching for about 15½ miles from Washington to Mount Vernon along a route skirting the Potomac River, was designed by the Bureau of Public Roads of the U. S. Department of Agriculture and intended to be the best example of road building ever undertaken by the federal government.

The national capital has another new structure which is conceded by authorities to be the finest Reptile House in the world. This palace is one of a number of buildings in the Zoölogical Gardens located in picturesque Rock Creek Park. It is attracting scientists and zoölogists from all over the United States and from many foreign countries. This Reptile House combines the finest features of zoölogical gardens in both the old and new worlds. Striking in its architectural splendor, the edifice of Italian Mosaic is profusely decorated both inside and out with colorful stones and with statues and models of odd reptiles of prehistoric and modern times. The interior walls are of marble, the floor is of terrazzo, and the living exhibits are housed in colorful compartments painted and decorated with living shrubbery in a way to simulate the native habitat of these strange denizens of the wilds. Visitors can see here a facsimile of native scenes from the world's outlands.

One of the main attractions of this famous reptile collection is the 14-foot King Cobra, most dangerous and aggressive of ten species of deadly cobra. It was this famous snake that created so much excitement when it was brought down from the New York Zoo to Washington. It slept in a Pullman berth in a special satchel which its keeper carefully covered with warm blankets to protect its health. This cobra is the presiding genius over this priceless collection of reptiles.

While it is the purpose of this article to stress new developments in Washington, it should be said in passing that there are hundreds of other attractions in the city that are not new. The beautiful Lincoln Memorial and the stately Washington Monument, each standing on a large circular terrace, the Academy of Sciences, the Smithsonian Institution, the Washington Cathedral, the Library of Congress, Mount Vernon, Arlington National Cemetery, the Capitol and the White House, are among the attractions seldom neglected by visitors.

Washington is indeed on the move. It is rapidly taking its place among the most attractive cities and capitals of the world. It has aptly been called a "Paradise of Parks." It is a city of open spaces where peace and comfort are evident on every hand. Visitors who view its constantly increasing wonders will enjoy a peculiar thrill at the thought of citizenship in a country where the ideals of life itself, as well as of individual and community achievement, remain the ever guiding principles that determine the destiny of the nation.

NOTE: The materials for this paper were provided by the Greater National Capital Committee of the Washington Board of Trade.

ASSOCIATION NEWS

WESTERN BRANCH A. P. H. A. THIRD ANNUAL MEETING

THE Western Branch of the American Public Health Association was organized in 1928, and with the sanction of the parent body, the American Public Health Association, has increased its membership to over 1,600 during these 4 years. Its purposes are to offer western public health people opportunities for exchange of experience, interchange of views with our eastern colleagues, and in general to promote western public health development.

Three major items of special western importance will be included on the program at the Denver meeting: Psittacosis, now apparently endemic in native western birds of the parrot family, to be discussed by Dr. Karl F. Meyer of the Hooper Foundation, San Francisco; reciprocal relations for the control of shell fish in Pacific ports to be discussed by the state health officers of California, Oregon, and Washington; Rocky Mountain spotted fever, with special reference to its similarity to typhus, discussed by Dr. R. H. Riley, Health Officer of Maryland. Several national as well as western public health problems will be discussed by both eastern and western authorities.

The meeting is to be addressed by Dr. Louis I. Dublin, President of the A. P. H. A. The presiding officer will be Dr. E. T. Hanley, City Health Officer of Seattle, President of the Western Branch. Other national authorities who have accepted invitations to appear on the program are: Dr. John Ferrell, President-elect, A. P. H. A.; Dr. E. L. Bishop, Chairman of the Executive Board, A. P. H. A.; Dr. Kendall Emerson, Acting Executive Secretary, A. P. H. A.; Dr. Taliaferro Clark, Acting Surgeon General, U. S. Public Health Service; Dr. H. W. Hill, Professor of Bacteriology, and Nursing, and of Health, University of British Columbia, Vancouver; Dr. M. P. Ravenel, Editor, *American Journal of Public Health*, and others.

NEW MEMBERS

The following list includes applicants who have been approved for membership in the A. P. H. A. by the Sub-committee on Eligibility. These new members have requested affiliation with the sections indicated, and action by the Section Council will follow.

Health Officers Section

Richard Binion, M.D., City Hospital, Milledgeville, Ga., Chairman, Baldwin County Board of Health

Tillman C. Britt, M.D., P. O. Box 605, Washington, N. C., Beaufort County Health Officer

Everett E. Carrier, M.D., Dyer County Health Unit, Dyersburg, Tenn., Director

Frank B. Clark, M.D., Gainesboro, Tenn., Director, Health Unit District 2

Preston H. Edwards, Jr., M.D., Franklin, Tenn., Assistant Health Officer, Williamson County

W. K. Fishburne, M.D., Moncks Corner, S. C., Director, Berkeley County Health Department

Ross L. Gauld, M.D., Jonesboro, Tenn., Assistant Director, Washington County Health Department

Edwin B. Gute, M.D., 5630 N. Lake Drive, Whitefish Bay, Wis., Health Commissioner

O. P. Hampton, Jr., M.D., 6801 Delmar Blvd., University City, Mo., Health Commissioner

Thomas H. Haynes, 516 West Vine Ave., Knoxville, Tenn., Director of Public Welfare

Robert D. Hollowell, M.D., Health Unit, Blountville, Tenn., Assistant Medical Officer, Sullivan County

Robert H. Hutcheson, M.D., Murfreesboro, Tenn., Assistant County Health Officer, Rutherford County Health Department

Wilson W. Knowlton, M.D., Rm. 546, State House, Boston, Mass., State District Health Officer

Marriott T. Morrison, M.D., 4705 Washington Ave., St. Louis, Mo., Chief Physician, Venereal Clinic, Department of Health

L. E. Viko, M.D., Public Safety Bldg., Salt Lake City, Utah, Health Commissioner

Laboratory Section

Carlos Bou, Department of Health, San Juan, P. R., Assistant Serologist

Luis S. Davila, P. O. Box 403, San Juan, P. R., Assistant Bacteriologist

Rollin W. Hoyt, 352 Western Ave., Boston, Mass. (Assoc.)

Dr. Jose Marques-Torres, Department of Health, San Juan, P. R., Pathologist

Americo Serra, M.D., Ponce, P. R., Director, Ponce Branch Biological Laboratory

Vital Statistics Section

Anna M. Scholfield, City Registrar's Office, City Hall, Providence, R. I., Statistician

Public Health Engineering Section

Alberto P. Amarante, C.E., Av. Afonso Pena No. 2524, Belo Horizonte, Brazil (Assoc.)

J. Lashley Johnson, State Department of Public Health, Nashville, Tenn., Sanitary Inspector

Robert McK. Clouse, Franklin, Tenn., Sanitary Inspector

Philip L. McLaughlin, Ohio Water Service Co., 59 Lincoln Way E., Massillon, O., Division Sanitary Engineer, Federal Water Service Corp.

Ira D. Ogle, Sumner County Health Unit, Gallatin, Tenn., Sanitary Inspector

Food and Nutrition Section

Rex D. Bushong, D.V.M., Department of Health, Nashville, Tenn., Associate Milk Specialist, U. S. Public Health Service

Child Hygiene Section

Franklin M. Erlenbach, Jr., D.M.D., 358 Commonwealth Ave., Boston, Mass., Clinician, Brookline Public Schools

Public Health Education Section

John W. Amesse, 624 Metropolitan Bldg., Denver, Colo., formerly President, Denver Public Health Council

Grace J. Blank, Chandler Court, Williamsburg, Va., Instructor in Public Health and Physiology, College of William and Mary

Isabelle F. Borden, M.D., State Education Dept., Albany, N. Y., Supervisor, School Medical Inspection

Herman E. Cohn, 1341 W. Madison St., Chicago, Ill. (Assoc.)

Julia L. Cummings, State Office Bldg., Hartford, Conn., Secretary, Connecticut Tuberculosis Committee

Myrtle Curnutt, 542 Fifth Ave., New York, N. Y., Director, General Health Bureau

John L. Fuller, Department of Biology and Public Health, M. I. T., Cambridge, Mass., Assistant

Allan J. Hruby, M.D., 1130 N. Lorel Ave., Chicago, Ill., Secretary, Board of Directors, Chicago Municipal Tuberculosis Sanitarium

Rosa Kuntz, Dresden, Tenn., County Nurse

Edward L. Markthaler, M.D., 1513 State St., Santa Barbara, Calif., Director, Health Education, State Teachers College

F. B. Morgan, State Department of Health, Nashville, Tenn., Associate in Health Education

Margaretta A. Smith, 237 Thompson St., New York, N. Y., Assistant General Director, Judson Health Centre

Public Health Nursing Section

Mary Bedford, R.N., Trenton, Tenn., Supervising Nurse, Gibson County Health Department

Myrtle T. Cross, R.N., Franklin, Tenn., Public Health Nurse, Williamson County Health Department

Velma DeMoss, R.N., Trenton, Tenn., Public Health Nurse

Nina E. Garrison, R.N., Franklin, Tenn., Public Health Nurse

Frances F. Hagar, R.N., Murfreesboro, Tenn., Chief Nurse, Rutherford County Health Department

Mrs. T. O. Hall, Box No. 12, Dayton, Tenn., County Public Health Nurse

Maude Hodge, R.N., Erwin, Tenn., Public Health Nurse

Margaret McC. Johnson, 516 W. Vine St., Knoxville, Tenn., Director, Knoxville Public Health Nursing Service

Martha P. Kelly, R.N., 904 Fair St., Franklin, Tenn., Public Health Nurse

Ora P. Moore, R.N., Trenton, Tenn., Public Health Nurse

Mrs. Nell T. Pearson, R.N., Humboldt, Tenn., Public Health Nurse, Gibson County Health Department

Mrs. Carrie K. Reynolds, Sumner County

Health Department., Gallatin, Tenn., Public Health Nurse
Ruth Skelley, R.N., Franklin, Tenn., Public Health Nurse
Roane Thornton, Gainesboro, Tenn., County Public Health Nurse, District 2
Archie Weatherly, Waverly, Tenn., Humphrey County Health Nurse
Josephine M. Wright, Gainesboro, Tenn., U. S. Public Health Service, Trachoma Prevention

Epidemiology Section

Jane N. Baldwin, M.D., Vassar College, Poughkeepsie, N. Y., College Physician
Irvin W. Sander, M.D., 1512 St. Antoine St., Detroit, Mich., Student (Assoc.)

Unaffiliated

Joseph H. Bishop, 157 E. Norwich Ave., Columbus, O., Student (Assoc.)
W. Compton Wills, 16th & French Sts., Wilmington, Del., Chief Engineer, Board of Water Commissioners

DECEASED MEMBERS

Peter H. Bryce, M.D., Ottawa, Ont., Canada, Elected Member 1883, Fellow 1922
Henry H. Brinkerhoff, M.D., Jersey City, N. J., Elected Member 1918, Fellow 1923
Louis Shapiro, M.D., Bangkok, Siam, Elected Member 1922, Fellow 1923
Mrs. M. W. Ainsworth, R.N., Sioux City, Ia., Elected Member 1928
John O. Polak, M.D., New York, N. Y., Elected Member 1929 (Assoc.)
Vinton A. Selby, M.D., Clarksburg, W. Va., Elected Member 1924
Joseph P. Yaffe, M.D., Boston, Mass., Elected Member 1930
O. I. Bemis, M.D., Modesto, Calif., Elected Member 1931

LETTER FROM GREAT BRITAIN

THE VALUE OF THE TUBERCULIN TEST

THE subject of tuberculosis appears to have received quite a marked amount of attention from investigators in this country recently. Within a few weeks of each other there have been issued two official publications, one from the Medical Research Council and the other from the Ministry of Health.

The former is a report by Dr. D'Arch Hart, Assistant to the Medical Unit, University College Hospital, London, while the latter is described as "A Report on Tuberculosis, including an Examination of the Results of Sanatorium Treatment," by Dr. MacNalty, Senior Medical Officer for Tuberculosis, in the Ministry of Health.

Dr. Hart, in his report, gives the results of tests performed upon a large number of clinically tuberculous patients of all ages and types of infection, and in contrast with these the effects following tuberculin tests applied to an almost equal number of clinically non-tuberculous individuals of all ages.

Many interesting observations are based upon the observations made, some of them being of real value and importance. Chiefly, Dr. Hart finds himself in a position to assert that the tuberculin test is one of scientific accuracy, though he qualifies this by saying that it is only so if the intracutaneous (Mantoux) test is used.

For the von Pirquet cutaneous test he has practically not a good word to say so far as reliability is concerned. Positive reactions, Dr. Hart warns, are not as yet capable of distinguishing an active tuberculosis from "the benign results of infection that has at some time or another been implanted in most members of an urban population."

The error in the case of the negative reaction being only about 2 per cent, its diagnostic value need not be questioned. This is particularly so in the case of children who have not become sensitized to tuberculin by chance exposure to infection. The possibility suggests itself that the test may be of real value from the preventive point of view by indicat-

ing the need for securing protection for individuals in households where a tuberculous patient has been living.

One of the beliefs Dr. Hart claims to have shattered as a result of his observations is that tuberculous infection is universal in later childhood among the poorer classes or general population of urban communities. This view was based upon the results of some of the prominent earliest tuberculin surveys, but in the case of London and some European and American cities appears to be untenable, as many as one-third or more of the clinically non-tuberculous children now being found to react negatively to the intracutaneous test at the age of puberty.

TWENTY YEARS OF TUBERCULOSIS SCHEMES

DR. MacNalty, though described as Senior Medical Officer for Tuberculosis, has interests and activities very much wider than this title would suggest. The work he has done in relation to diseases of the central nervous system is very well known, particularly his official reports on encephalitis lethargica. These and his lectures as Milroy Lecturer of the Royal College of Physicians in 1925 on epidemic diseases of the central nervous system, indeed, have secured for him a reputation that has extended far beyond the boundaries of Great Britain.

The possibility that this report on tuberculosis may go some way towards enhancing that reputation is not impossible, for, though ostensibly he treats of the problem from the local point of view, any study of tuberculosis and any information submitted with regard to it must have a wide application and call for attention from everybody concerned in dealing with the disease.

Dr. MacNalty's primary object has been to carry out a survey of the work done in relation to tuberculosis since the more or less general establishment of anti-tuberculosis measures by local health authorities. As something like 20 years have elapsed since this happened, this would seem an appropriate time for making such an examination. The system adopted is an interesting one, and the ground appears, so far as can be judged by present-day lights, to have been very properly and completely quartered.

Figures that suggest that there is a decline both in incidence and mortality are set out, though a statement, bluntly made, that " there are no accurate figures available in regard to incidence of tuberculosis in England and Wales," is likely to startle and even annoy those complacent ones—of whom there are probably many—who cannot imagine any schemes with which they are associated doing other than superlatively.

The system of notification has been in operation for round about 20 years and, like any such system, works very much more satisfactorily as a means of providing information upon which preventive action can be based than as a method of providing amusement for the statistically minded. For these latter the death rates are a more accurate and fruitful source of entertainment. In the case of tuberculosis, to the preventive officer they afford gratification also, revealing that between 1901 and 1929 the standardized death rates per million have fallen from 1,807 to 932.

In his report, Dr. MacNalty explains fully the methods that have been followed and that may be taken to have assisted in bringing about this result. Having examined these carefully, the conclusion he arrives at is that " the diminishing figures of tuberculosis year by year afford great encouragement to anti-tuberculosis work and proof of its value." And of sanatorium treatment, the results of which he set out to investigate, he finds himself able to say that it is the most effective method of treating the disease.

As a contribution to the literature of tuberculosis and a review of practice in relation to the preventive treatment of the disease, Dr. MacNalty's report has very much to commend it.

SIR WILLIAM R. SMITH

BY the death of Sir William R. Smith, which occurred rather suddenly on March 17, public health and preventive medicine lost a figure of some prominence. Though he had never actually held a post as medical officer of health, he was responsible for the training and teaching of large numbers of those now in office in various parts of the world. One of his claims was that it was he who was primarily responsible for having it made law that before an individual could be appointed to such a post he must possess specified qualifications.

The Royal Institute of Public Health, of which he was Principal and, in fact, the founder and central figure, provided full courses of training for such qualifications. In addition, it functioned as a learned society dealing particularly with preventive medicine, and provided facilities on a commercial scale for carrying out chemical and bacteriological investigations for local authorities and others.

Sir William Smith enjoyed something of an international reputation, which he owed mainly to the fact that his Institute made a practice of holding an annual conference, choosing commonly as the venue some university city outside the British Isles.

In addition to British medical and legal qualifications and honors, Sir William Smith had numerous foreign degrees, honors, orders, medals, and decorations of extreme brilliance conferred upon him. A man of great energy, he took part in a vast variety of work, and was a member of an infinity of public bodies, sharing fully in all their activities up to the very day of his death at the age of 83.

Probably the Royal Institute of Public Health was his favorite concern, and as he was its moving spirit and was engaged in providing a new home for it when he died, there exists some uncertainty as to what the future is likely to be. To any who knew him it seems impossible to believe that anybody like him or able to fill his place will ever be found.

THE SEDGWICK MEMORIAL LECTURE

THE invitation to Dr. W. G. Savage, County Medical Officer of Health of Somerset, to deliver the Sedgwick Memorial Lecture for 1932 at Boston, has given very great pleasure here. Dr. Savage is one of the more prominent of the county medical officers of health in England, and has devoted very much more time than any of his colleagues to laboratory and research work.

It was while he was Medical Officer of Health of Colchester that he began this work with investigations into questions relating to food, and since then he has continued research in this direction, and has contributed very largely to the common stock of knowledge.

He has made a number of special investigations on behalf of the Ministry of Health with regard to bacterial food poisoning and such like subjects, and as an authority on milk—the county of Somerset being one of the milk producing counties—he is extremely well known.

At the moment he is not, I think, connected with any teaching institution, but he has held a number of special lectureships, and commonly, I believe, has chosen some subject having reference to food bacteriology and food poisoning.

London CHARLES PORTER, M.D.

PUBLIC HEALTH ADMINISTRATION

Diphtheria Prevention in New Jersey—An attractive and interesting report has been issued of the 3-year state campaign for the prevention of diphtheria conducted by a committee representing the State Medical Society, the State Board of Health, the State Board of Education, the State Health Officers' Association, the Anti-tuberculosis League, and other organizations. The work was highly organized under a central executive council. A publication committee prepared lectures and passed upon literature used throughout the state. A press committee of representative newspaper men was chosen, and the use of these names on the news releases, which were periodically sent out from the distribution office of the committee assured a general use of the material.

Two major policies of the committee were that the campaign should be as far as possible guided by physicians, and should be conducted as largely as possible on a voluntary basis without the expenditure of large special funds appropriated or otherwise secured for the purpose. At least monthly meetings were held.

Among the activities were included the preparation of three standard lectures, to professional groups, to lay audiences, and for radio talks, and the use of 500, 24-sheet billboard posters of a diphtheria film trailer, of 5,000 attractive posters for doctors' offices, of monthly news articles, of a series of campaign letters, and of much other literature. Chairmen of 21 local committees were carefully selected medical men.

During the year following the organization of the committee, the State Department of Health reported about 125,000 children immunized in public clinics. Thirteen counties reported 212,150 children immunized during the first 2 years, two counties indicating that 75 per cent and 77 per cent of their children respectively were protected. Sixty-nine lecturers gave 258 talks before a combined audience of 53,465 during this period.

It is noteworthy that during the third year, emphasis was placed on the protection of the preschool child. It was concluded that if the disease were to be eradicated by the protection of children before school entrance, it would be necessary to increase public clinic service or to secure a corresponding increase in the interest and participation of physicians in private practice. New literature and activities were developed in order to further personal education and contact with parents of preschool children in order to convince them of the need for this protection.—Three Year Report, Committee for the Prevention of Diphtheria, F. J. Osborne, Chairman, Health Officer, East Orange, N. J.

Preventive Measures in Illinois—The volume of preventive practice, in relation to the prevalence of certain diseases subject to control through vaccination and diagnosis by laboratory procedure, increased very noticeably in Illinois during 1931, according to statistics available from the State Department of Public Health.

The amount of toxoid and toxin-antitoxin distributed by the department indicates that 21 children were immunized against diphtheria for each case reported in 1931 against 16 to 1 in 1930

and 11 to 1 in 1929. For each case of smallpox 54 people were vaccinated in 1931 compared with 15 per case in 1930 and 21 per case in 1929. Against typhoid fever 20 people were vaccinated per case in 1931 compared with 21 per case in 1930 and 12 per case in 1929.

The diagnostic laboratories of the department examined for typhoid fever 13 specimens per case reported in 1931 compared with 9.5 per case in 1930. For diphtheria there were 2.5 specimens per case examined in 1931 compared with 1.4 per case in 1930. For tuberculosis the rate was 1.5 specimens per case in 1931 and 1.4 in 1930. For these three diseases 40,155 specimens were examined during 1931 against 35,984 although the aggregate number of cases reported declined from 18,997 in 1930 to 16,667.

Racine, Palo Alto, Milwaukee, and Detroit—The first four annual reports to be received for the calendar year 1931 are from these four cities, each of which was an honor city in the U. S. Chamber of Commerce Health Conservation Contest. These annual reports are not cluttered with long tiresome statistical reports but contain a few figures, sufficient to show the trend in mortality, morbidity, and birth rates, and present the reader with a clear conception of the type of service being rendered.

The death rates per 1,000 population were unusually low; 9.0 for Racine, 9.4 for Palo Alto, 9.1 for Milwaukee, and 8.8 for Detroit. The Health Commissioners ascribe the low rate to a number of circumstances, among which are the absence of epidemics of influenza and pneumonia; the favorable climatic conditions, with no extremes of heat or cold; the fact that people are leading more normal lives, indulging in simpler foods, securing longer hours of sleep, and relieved of some of the hazards of industry; and last but not least the fact that the programs of health education are taking root and stimulate a responsive consciousness in the mind of the average citizen which has brought about a higher rate of protection against diphtheria and smallpox, a more frequent health examination, and more general practice of the simple regulations of personal hygiene.

The Health Commissioner of Milwaukee sounds a note of warning to the effect that although the tuberculosis death rate in each city has shown a marked decrease, there are many whose resistance has been lowered by worry and an inadequate food supply, and in the near years to follow this may result in a higher tuberculosis incidence. He feels that the foundation for an increase in the tuberculosis death rate of future years was laid in many homes during 1931.

In Detroit, in 1931, there were 13,403 deaths with a rate of 8.8, based upon an estimated loss in population of 70,000. Had the United States estimate of population been used, the death rate would have been even lower. This is the lowest rate in the history of the city. The birth rate was 18.6; the infant mortality rate 57.0; 47 per cent of births occurred in hospitals; 96.2 per cent of births were attended by physicians. Suicide and appendicitis for the first time appeared among the 10 principal causes of death, having taken the place of the acute communicable diseases and diarrhea and enteritis.

In Milwaukee, in 1931, there were 5,354 deaths. Had the rate of 1910 continued, there would have occurred 7,500 deaths. The yearly saving over the rate of 1920 is 1,505 lives. The infant death rate was identical with that of Detroit, 57.0. It is noted that there were 624 non-resident deaths in the city compared to 872 resident deaths outside of the city. Apparently tuberculosis cases are being hospitalized outside of the city limits as there were 22 more resident deaths from tuberculosis out-

side of the city than the average number for the 5 previous years.

In Palo Alto, there were 136 deaths, a rate of 9.4; there were 148 new babies with only 2 deaths, an infant mortality rate of 13.5.

In Palo Alto, there were reported but 2 cases of diphtheria with no deaths. In Milwaukee the incidence of this disease continues to decrease, there being 126 cases reported with 11 deaths. Detroit also saw a new low mark for diphtheria with 96 deaths or a rate of 6.3 which is less than one-third of the average for the preceding 5 years. Practically all communicable diseases showed new low records in Detroit. The typhoid death rate was less than 1; the tuberculosis death rate was reduced by more than 10 per cent over the preceding year; there were only 2 deaths from measles and a new low rate was established for scarlet fever. In Milwaukee, there were but 11 cases and 2 deaths from typhoid fever, a rate of 0.34.

Medical participation and coöperation continue to be the keynote of progress. In Detroit, all diphtheria preventive work has been continued through the agency of the family physician, resulting in protection to approximately 70 per cent of the children between the ages of 6 months and 10 years. Medical participation has been extended into the tuberculosis program with the establishment of a case-finding plan. A group of coöperating dentists has also been established. In Milwaukee, the medical profession has worked in close coöperation with the Health Commissioner.

There were two absorbing new interests in the Racine Health Department: first, the Health Department moved into its new and commodious quarters; and second, with the coöperation of the County Medical Society, a new program was undertaken to reduce the maternal mortality. In Racine, particular emphasis has been laid upon the educational features of health work. The Health Commissioner has been very active in radio broadcasting and has worked out unique methods of presenting his material in the form of dramatic episodes. The infant mortality rate was 36.2 per 1,000, the lowest that the city has ever experienced. The diphtheria death rate was 4.4, which is the same as for the preceding year.

These health department reports are to be commended for their simplicity, timeliness, and their general appeal to the serious minded citizen.

Serving the Small Community—The 13th annual report of the Commonwealth Fund states that the major programs have one common characteristic in that they rely upon the interplay of selected social factors to accomplish ends which the exclusive use of a single approach would be less likely to attain. In public health work, the Fund is aiding in the work of the small general hospital, the rural public health unit, and the professional service of the rural physician.

> Through the hospital, its function is broadly defined and its work is flexibly directed, a sheaf of educational influences can be brought to bear upon both physician and layman which, in the long run, may revolutionize the philosophy of rural medicine and the practice of community health.

Emphasis was given during the past year to better administration within the hospitals and to the development of plans for out-patient service. The 50-bed hospital is considered economically justified only if it is a compact unit, functioning smoothly with a small and well trained staff. In the 6 hospitals supported by the Fund, the increase in average occupancy during the year was 12 per cent—from 21.2 to 23.8, against a theoretical maximum of 50. The experience of small hospitals indicates that an average occupancy of approximately 35 would be normal for a 50-bed unit.

Direct educational activities associated with the hospital program—institutes for physicians and nurses, and postgraduate fellowships for physicians and dentists—were continued.

A fivefold program of rural medical service and rural health has been developed in which the small town general practitioner plays a central rôle. In the three states of Tennessee, Massachusetts, and Mississippi the activities were as follows:

1. Fellowships to enable rural physicians to do postgraduate work (15 to each state)
2. Provision for the strengthening of the teaching of preventive medicine in the undergraduate medical school
3. Scholarships to encourage the preparation of promising medical undergraduates for rural practice (5 to each state)
4. Intensive development, as a demonstration for other communities, of public health service on a county or town-union basis (2 units in each state)
5. State-wide advisory service, through a traveling unit of the state health department, in the development of rural public health service generally.

It is believed that a really progressive health department cannot reach its objectives unless the health officer thinks of himself, and the local physicians think of him, as a colleague of the general practitioner, specializing on certain forms of health service which involve communal action, and acting as a general consultant on the broadly educational phases of medicine. Through a division of health studies, efforts are being made to evaluate health work in terms of measurable results in separate fields of activity and to examine critically the evidences of progressive integration.—*Ann. Rep.*, Commonwealth Fund, 1931.

Cincinnati Health Federation—The chief concern of the Public Health Federation during 1931 was the mobilization of the health resources of the community to forestall, so far as might be, the probable ill effects of adverse economic conditions. A minimum food budget was prepared with the help of physicians and nutritionists and distributed to all organizations caring for needy families. A second evaluation of the county health department activities was completed. A study was made of facilities for medical care of sick poor.

A joint committee of the Academy of Medicine, the Dental Society, the Better Business Bureau and the Federation has devoted itself to the task of trying to protect the public from fake and misleading medical advertising.

Assistance was given the Anti-Tuberculosis League in sponsoring a bond issue for the expansion and remodeling of the tuberculosis sanatorium. A cancer control council is made up of physicians and surgeons, dentists, nurses, health educators, and lay people.

A campaign of education is carried on through the medium of the newspapers, the radio and lectures to various clubs and societies. Comprehensive reports of several other public health councils indicate the broad scope of work of the Federation.—*Fourteenth Ann. Rep.*, Public Health Federation and its Councils, Cincinnati.

Maternal and Child Welfare Work by the Public Authorities, Germany: Prussia—The last annual report of the Ministry of Public Welfare of Prussia for 1929 gives an account of the maternal and child health work done in that country by the government. The report discusses the work of 348 prenatal health centers in that country for the examination of expectant mothers. Almost 19,000 women were examined in Berlin alone in the last fiscal year; one-fifth of them showed pathological conditions, but with repeated examinations it was possible to improve their health and to prevent complications. The majority of municipalities and rural communities provide financial aid in cases of poverty, in addition to the maternity

benefits paid under the federal laws. About 3,700 infant health centers were maintained with public funds, and they reached about two-thirds of the 700,000 children born annually in Prussia. A larger proportion of children are cared for at the centers in the cities than in the rural districts.

In many cities the work of the infant health centers extends to children of preschool age; in other cities special centers are provided for such children. About 400,000 children were reached by the centers reporting to the Ministry of Social Welfare. The public authorities also maintain large numbers of kindergartens and other arrangements for children of preschool age, such as day centers, rest homes in cities and in the country, clinics for ultra-violet ray treatments, and lunch rooms.

According to the report the health work extends to a larger proportion of school children—3,000,000 out of 3,600,000—than to children of other ages. Almost 3,200 school physicians and 4,600 school nurses were employed in the last year. Dental service has been given in the great majority of public schools; of the nearly 2,000,000 children whose teeth were examined in 1929, 44 per cent were found to be in need of treatment. School lunches were served to half a million children in about one-fifth of the public schools in Prussia. The municipal authorities are also maintaining a large number of rest homes and vacation homes for school children, and more than 600,000 children were thus accommodated in 1929.—*Archiv. f. Soziale Hygiene und Demographie*, Berlin, Vol. 6 (Sept.), 1931.

LABORATORY

A MODIFIED CELLOBIOSE BROTH FOR THE DIFFERENTIATION OF B. COLI AND B. AEROGENES

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CELLOBIOSE was first proposed as a medium for the differentiation of *B. coli* and *B. aerogenes* by Jones and Wise[1] in 1926, and was very carefully correlated with other mediums by Koser.[2] It was later used by Lewis and Pittman[3] and by Perry[4] and probably others.

The authors of the method, Jones and Wise, used this sugar in a concentration of 0.5 per cent in a broth containing 0.3 per cent Difco beef extract and 1 per cent Difco peptone. It was sterilized in an autoclave for 20 minutes at approximately 121° C. They do not tell how acid production was determined.

Koser, in his study of the method, added 0.5 per cent of cellobiose to a standard meat extract, peptone medium, plus 0.5 per cent agar, plus bromthymol-blue (pH range 6.0 to 7.6) in the amount suggested by Baker[5] (12 c.c. of a 0.2 per cent alcohol solution per liter). It was put into small tubes, in 2 to 3 c.c. amounts, and sterilized in an autoclave. This made a soft agar which was inoculated by stabbing with a straight wire. Gas production was detected by the torn appearance of the

agar medium and acid formation by the change in the indicator, brom-thymol-blue (blue to yellow). Incubation was at 30° C. for 48 hours as a routine procedure.

Lewis and Pittman employed Koser's method. Perry used the same soft agar method and, to a limited extent, broth fermentation tubes. The concentration of cellobiose used was 0.5 per cent and brom-thymol-blue was employed as an indicator for acid formation. A 4-day incubation at 37° C. was used. He says of it: "The cellobiose test has been found the most satisfactory single test for this purpose" (differentiation of *B. coli* and *B. aerogenes*).

In the method here reported the medium used was a standard sugar-free broth containing 0.3 per cent of beef extract and 0.5 per cent of peptone (Armour's bacteriological). To each 100 c.c. of this broth was added 0.25 gm. of cellobiose (Difco) and for an indicator of acid formation, 0.875 c.c. of a 0.05 per cent solution of brom-cresol purple (pH range 5.2 to 6.8). It was tubed in very small fermentation tubes and sterilized in an Arnold sterilizer, 45 minutes on 3 successive days. (The experience of Jones and Wise and Koser indicates that it can safely be autoclaved.) The regular inner tubes (8 mm. inside diameter) of the Dunham fermentation vials were used as the outer tubes. For inner tubes, glass tubing of about 5 mm. outside diameter was cut into 7/8" lengths and these sealed at one end. One c.c. is sufficient medium for one of these fermentation tubes.

In the first trial of this medium a concentration of 0.5 per cent of cellobiose was used. In a later batch a concentration of 0.25 per cent was accidentally employed and as the lot of medium apparently worked just as well, this concentration was adopted. (It was stated by the authors of the method that a lower concentration of the sugar might prove equally satisfactory.)

TABLE I

CORRELATION OF CELLOBIOSE TEST WITH OTHER MEDIUMS AND METHODS FOR THE DIFFERENTIATION OF B. COLI AND B. AEROGENES

Culture	37° C. Incubation			46° C. Incubation
	Cellobiose Broth		Koser's Citrate Broth	Eijkman's Dextrose Peptone Broth Gas Formation
	Acid Formation	Gas Formation		
Group I—Typical B. Coli from Feces Freshly Isolated				
1. McAllister T_1	−	−	−	5%
2. " T_2	−	−	−	5%
3. Griggs T	−	−	−	10%
4. Abell T_1	−	−	−	10%
5. " T_2	−	−	−	10%
6. Ornsbee T	−	−	−	20%
7. Hoffman T_1	−	−	−	10%
8. " T_2	−	−	−	5%
9. " T_3	−	−	−	−
Group II—Atypical B. Coli not Freshly Isolated				
10. No. 2	−	−	−	20%
11. No. 3	−	−	−	30%
12. No. 4	−	−	−	5%
13. No. 5	−	−	−	10%
Group III—B. Aerogenes				
14. No. 1	+	50%	+	−
15. No. 2	+	10%	+	−
16. No. 3	+	75%	+	−
17. No. 5	+	50%	+	−
18. No. 11	+	50%	+	−
Group IV—Irregular or Intermediate Forms				
19. Sewage E	+	Trace only	+	
20. Sewage F	+	−	−	
21. Feces—Montgomery	−		+	

It has been employed many times as a differentiating medium in studying the growths on Levine's Eosin Methylene Blue Agar, transfers being made by means of a straight wire from separate colonies on the plate. Incubation is at 37° C. Acid and gas formation with *B. aerogenes* is rapid, easy to observe, and frequently positive in 24 hours. In 48 hours the results are usually final. In only a very few cases were the results indeterminate, that is, acid + and gas — or acid — and gas +.

It was found to work with great uniformity of results on pure cultures of *B. coli* and *B. aerogenes* freshly isolated from feces. A few correlations were made with Koser's citrate and with Eijkman's dextrose broth at 46° C. incubation. The accompanying table shows a selected list of these results. There are included a few that do not show perfect correlation. They indicate quite definitely that this medium may be depended upon to give results that are in line with those found by Koser and others.

At $6.00 per gm. for cellobiose the cost for this constituent is only $.015 per tube. With a reduction in the price of this sugar in the market, which may reasonably be expected, this obstacle in the way of its more general use would be removed.

SUMMARY

The cellobiose broth of the authors, Jones and Wise, has been modified by the reduction of the concentration of cellobiose to 0.25 per cent and the addition of brom-cresol purple as an indicator. The cost has been reduced by tubing in micro tubes that require only 1 c.c. for filling. Gas and acid formation are rapid and definite and sufficient correlation study has been made to indicate that the same results are obtainable as those found by Koser, who noted excellent correlation in the case of the two well defined sections of the group, with several other differentiating mediums, particularly with citrate broth, and also with the known source of the culture.

REFERENCES

1. Jones, H. N., and Wise, L. E. Cellobiose as an aid in the differentiation of members of the Coli-Aerogenes group of bacteria, *J. Bact.*, XI: 359 (May), 1926.
2. Koser, S. A. Cellobiose fermentation by Coli-Aerogenes group, *J. Infect. Dis.*, 38: 506 (June), 1926.
3. Lewis, I. M., and Pittman, E. E. The correlation between differential tests for colon bacteria and sanitary quality of water, *J. Am. W. W. Assn.*, 19: 78 (Jan.), 1928.
4. Perry, C. A. The significance of aerobic non-sporulating bacteria producing gas from lactose in oysters and water, *Am. J. Hyg.*, X: 580 (Nov.), 1929.
5. Baker, H. R. Substitution of brom-thymol-blue for litmus in routine laboratory work, *J. Bact.*, 7: 301 (Mar.), 1922.

ACKNOWLEDGMENTS—The author wishes to acknowledge the assistance of George H. Chapman of the Clinical Research Laboratory of New York in supplying freshly isolated pure cultures of *B. coli* and *B. aerogenes*, also of Marjorie S. Clapp and Priscilla Johnson, bacteriologists, who performed the laboratory work of the study, here reported.

PREPARATION OF MEDIUM FOR THE CULTURE OF BACTERIUM TULARENSE

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LABORATORY workers have experienced some difficulty in growing *B. tularense*. This is especially true when the organism is cultured on a large scale for the preparation of antigen where the addition of blood to the medium is undesirable.

The following method of preparing the medium has proved satisfactory in the laboratory. The ingredients present and the quantities used are those recommended by Francis, but the method of preparation has been modified somewhat.

Beef infusion broth is prepared in the usual manner with the addition of 1 per cent peptone and 0.5 per cent NaCl. This is titrated and the reaction adjusted to pH 7.3. The broth is then sterilized for 15 minutes at 15 lb. pres-

sure, cooled, filtered and titrated again. Any needed correction in reaction is made and the broth again sterilized at 15 lb. for 10 minutes. It is then titrated a third time and the reaction again corrected to pH 7.3 if necessary. With each sterilization the change in reaction becomes progressively less and often no correction is necessary after the third titration.

It was found that subsequent sterilization did not change the reaction and that additional titrations of the medium were therefore unnecessary. It is this drift toward the acid phase which, if left uncorrected, probably accounts for more failures in the culture of *B. tularense* than any other one factor. While this method is suggested for *B. tularense*, it should be equally applicable to any organism that has similar requirements of a definite and constant pH value.

After the third titration and correction, 2 per cent agar, 1 per cent dextrose and 0.1 per cent pulverized cystine are added to the broth. The medium is distributed into large bottles or into test tubes, depending on whether it is to be used for stock cultures or for growing the organism for antigen. The medium is then given a final sterilization at 15 lb. for 20 minutes.

For antigen production we use 1 liter prescription bottles, adding 150 c.c. of the medium to each bottle. For stock cultures rabbit blood is added to the tubes under aseptic conditions.

The agar in the large bottle is agitated just before it is cool enough to solidify. This is desirable, as the cystine, being insoluble, settles out with any precipitate which may form during sterilization. Each bottle is placed on its flat side and allowed to solidify. The flat surface thus exposed is inoculated in the usual way. *B. tularense* grows on this medium with an odor resembling freshly cooked meat. Any sour or musty odor is in itself proof of contamination even before it is confirmed by stained preparations.

VITAL STATISTICS

ACCIDENT CLASSIFICATION PROBLEMS IN NEW YORK STATE

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AS the New York State Health Department reports contain data for the entire state it was necessary, upon adoption of the last revision of the *International Classification of Causes of Death*, that this department and New York City employ a common code. New York City had been tabulating in detail statistics of fatal accidents—especially transportation accidents. Since they wished to continue, we agreed to code the following types: accidents in mines and quarries, by machinery, or by means of transportation without reference to the *International List* and to present these deaths in a supplemental table under the numbers used therein.

It is quite simple to code "machinery," "mines and quarries," and "transportation" accidents, but to classify the same by the International number presents a question—whether to code as a "crushing accident" (No. 186) or "other accidents" (No. 194). New York City Health Department assigns most automobile accidents, where a fracture is involved, to "crushing" (No. 186), but the U. S. Bureau of the Census informs us such cases should be coded under Title 194 unless crushing is definitely stated. This department desires to agree with the Census, but our figures should be comparable with those of New York City.

A death certificate, covering an automobile accident, seldom specifies "crushing," but in many instances states fracture of portions of the body, and, when death results from overturning or collision with another vehicle or pedestrian, "crushing" is a logical conclusion.

Old No. 185 (falls) and old No. 188 (accidental traumatism by other crushing) would be comparable to new No. 186 only if most transportation accidents were included therein. Of 928 accidental deaths in the first 6 months of 1931, we assigned 837, or 90 per cent, to Title 186.

The question to be settled is: Where no definite statement of "crushing" appears on the certificate, or where it cannot be obviously deduced, should vehicular accidental deaths with fractures be assigned to No. 186 or No. 194?

VITAL STATISTICIANS AND THE SAFETY MOVEMENT

R. L. FORNEY

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THE safety movement recognizes that registrars of vital statistics have made real progress in the past few years in the collection of data on accidental

deaths. Only one state is now missing from the registration area; death reporting in the registration states is becoming more complete; the new standard death certificate provides for more information on accidental deaths; and the new *International List of Causes of Death* shows great improvement in the accident classifications.

Vital statisticians, however, are just on the threshold of helping and influencing the safety movement. The work done so far is fundamental and basic. The plans have been made and the foundations laid. Now, the time has come to start building the information that those interested in accident prevention need so badly, and which is available from no other source. The United States and Canadian registrars should develop this information with 3 things in mind: uniformity, simplicity, and timeliness.

We have uniformity, of course, in the accident classifications of the International List. In addition to this we must also have uniformity of definition for industrial, home, and public accidents.

In mentioning simplicity I have in mind that there is need for a simple one-dimensional classification of accidental deaths which, with cross classification by age, can be shown on a single sheet, which will be intelligible to the ordinary person, and will contain the essential data about accidental deaths. Such a sheet is being given you in connection with this paper. On the reverse side of the form, also shown, are the definitions of industrial, home, and public accidents. Certain registrars have been preparing a form approximately like this for several years—Alabama, Kansas, North Dakota, New York, Ohio, Missouri, and perhaps others.

The third element of a useful reporting procedure is timeliness. Many state health departments now issue monthly bulletins; the U. S. Bureau of the Census has current releases on automobile accidents and other items. Vital statistics should provide a running record of mortality information which will guide the day-to-day and month-to-month efforts in behalf of health and safety. To accomplish this purpose it is desirable that this meeting go on record as favoring the preparation of a report of this kind monthly by the state registrars.

The principal purpose of such a summary would be to arouse and maintain interest within the state. In most states we find safety councils, women's clubs, schools, etc., all interested in accident prevention from a state-wide point of view. These organizations would appreciate the efforts of the state registrar in preparing the information; and the influence and prestige of the health department would be enhanced by such services. Such summaries could also be collected from the various states and summaries could be prepared that would have national significance.

Accidents Sixth Important Cause of Death

It is unnecessary to stress the importance of the accident problem. In the country as a whole, accidents are the sixth most important cause of death. In some of the states represented here they lead the list, and among others are in second or third place. Among men accidents are the second most important cause of death in the entire country. Among children from 5 to 14, accidents cause twice as many deaths as any disease. The safety movement, therefore, appeals to vital statisticians on sure grounds.

Public health officials have a real responsibility in the safety movement, and the first and fundamental thing they can do is to obtain and summarize the facts about accidental deaths, and then present them to the public on a uniform, simple, and timely basis.

(Send one copy of this report to the National Safety Council, Inc., 20 N. Wacker Drive, Chicago)

Accidental Death Summary for.....Month of.....193 .
(City, County, State)

	Type of Accident	All Ages (A)	0–4 (B)	5–14 (C)	15–64 (D)	65 and Over (E)
	1. Grand Total					
Industrial	2. INDUSTRIAL TOTAL					
	3. Agriculture					
	4. Mining and Quarrying					
	5. Other Extractive Industries					
	6. Manufacturing					
	7. Construction					
	8. Transportation and Public Utilities					
	9. Trade					
	10. Clerical and Professional Service					
	11. Other Occupational Accidents					
Home	12. HOME TOTAL					
	13. Falls					
	14. Burns, Scalds and Explosions					
	15. Asphyxiation and Suffocation					
	16. Firearms					
	17. Poisons					
	18. Other Home Accidents					
Public	19. MOTOR VEHICLE TOTAL					
	20. Collision with Pedestrian					
	21. Collision with Other Motor Vehicle					
	22. Collision with R. R. Train					
	23. Collision with Electric Car					
	24. Collision with Bicycle					
	25. Collision with Horse Drawn Vehicle					
	26. Collision with Fixed Object					
	27. Non-Collision					
	28. PUBLIC (NOT MOTOR VEHICLE) TOTAL (Priority given to items 29 to 33)					
	29. Railroad—Not with Motor Vehicle					
	30. Street Car—Not with Motor Vehicle					
	31. Other Vehicle—Not with Motor Vehicle					
	32. Water Transportation					
	33. Air Transportation					
	34. Falls					
	35. Burns, Scalds and Explosions					
	36. Drowning					
	37. Firearms					
	38. Other Public Accidents					

Important! (Fill in blanks)	In addition to the.....motor vehicle deaths in public places, shown above, there were.....fatalities involving motor vehicles in homes and work places, making a grand total of.....motor vehicle deaths. Of this grand total, ...were of persons gainfully employed at the time of the accident.

(Please see reverse side for Instructions and Definitions)

National Safety Council, Gen. Stix, 1, 12–31—2M

REVERSE OF FORM

INSTRUCTIONS

For cities this report is intended to cover all deaths that result from accidents occurring in the city. Deaths in the city that result from accidents occurring outside should not be included. But deaths occurring outside the city as a result of accidents within the city should be included.

For states the report should cover all accidental deaths occurring in the state regardless of where the accident occurred. The exceptions noted above for cities are less important for states and should therefore be disregarded.

In either cities or states THE INFORMATION NECESSARY TO COMPLETE THIS REPORT CAN BE OBTAINED ONLY FROM THE RECORDS OF THE REGISTRAR OF VITAL STATISTICS. Police departments or others who can expect to get complete information on traffic accidents only will be supplied with a different form, on request to the National Safety Council, Inc., 20 N. Wacker Drive, Chicago. The traffic accident form provides for a detailed analysis of fatal, non-fatal, and property damage accidents and their circumstances.

DEFINITIONS

A. INDUSTRIAL ACCIDENTS.

This classification includes all accidents arising out of and in the course of gainful employment unless injured person was a domestic servant; or was operating, riding in, or struck by a land, air, or water vehicle. However, when such a vehicular accident occurs in a railroad shop or yards, or other industrial work place not open to the public, it remains in the industrial classification.

B. HOME ACCIDENTS.

This classification includes all accidents occurring wholly within domestic premises (within the building, lot or apartment lines of any domicile) except when the injured person was a gainfully employed person other than a domestic servant.

C. PUBLIC ACCIDENTS.

This classification includes all accidents other than those described in Sections A and B. This group of public accidents is separated into two parts: (a) Accidents involving a motor vehicle; (b) Accidents not involving a motor vehicle.

This Report Prepared by:
Name .....
Title .....
Department .....
Address correspondence to .....

KEEPING THE PUBLIC INTERESTED IN ACCIDENT DATA

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THE Kansas State Board of Health during the past 3 years has made a special study into the cause and also the possibilities of the prevention of accidental deaths. The reason for this study was the definite increase from year to year in the number of accidental deaths which occurred in the state. In the past 6 years, in only one have accidental deaths been less than 6 per cent of the total, and in 1930, 8.3 per cent of the 19,583 deaths were charged to external causes.

The old form of standard death certificate did not provide for any information in regard to deaths from external violence. The new form provides for the inclusion of this, if the questions are answered on the certificate. If these questions are answered on all such deaths, it is possible to classify them as to the place of origin and the type of accident. The new standard form does not allow for the inclusion of some of the data which our department is collecting.

We have found six principal sources for the distribution of material in regard to accidents and their prevention: (1) the press, (2) the radio, (3) safety

speakers, (4) city and county health officers, (5) safety chairmen of the American Legion, and (6) safety directors of various types of utilities and industries.

The newspapers have made liberal use of accident material prepared by the State Board of Health. Thirteen summaries were prepared on accidental deaths in 1930, and received wide distribution through the public press.

Our department has available the service of a broadcasting station for a 7-minute broadcast each week. During the past 5 months we have prepared and had broadcast, with an estimated audience of 4,000,000 persons, 4 papers on fatal accidents reported during 1930. As a response, we have received a request from a utility company for a copy of one of these in order that it might be mimeographed and distributed to the employees of this company, which operates in 9 states.

The public is interested in accident prevention and will give careful consideration to material which is prepared and presented in an attractive manner.

NOTE: These three abstracts are of papers read at the Special Session on Accidents of the Vital Statistics Section of the American Public Health Association at the Sixtieth Annual Meeting at Montreal, Canada, September 16, 1931.

PUBLIC HEALTH ENGINEERING

MODERN METHODS OF RODENT CONTROL

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LOS ANGELES is a modern city and appreciates its responsibility to the world commerce that enters its harbor. It created some years ago the Division of Rodent Control as a part of the city's Health Department. Mindful of the losses that many cities of the world have suffered from rodent-borne diseases, in times past, Los Angeles wages a constant warfare against all rodents. The Division of Rodent Control is now functioning with a personnel of 13 inspectors, trained in the habits of rodents and capable of prompt and intelligent action at the right time.

In a city of 1½ million, and comprising 465 square miles of territory, the task of eliminating the rodent population is indeed a difficult one. In addition to depleting their number approximately 5,000 per month, this division maintains a monthly index, ever holding itself in readiness as an efficient nucleus of a larger, adequate force in the event of an emergency. If a department of health is to protect and safeguard the public properly, it must maintain such a unit. This applies especially to seaport cities where vessels arrive from all parts of the world.

This division has succeeded, since its inception to the close of the fiscal year for 1931, in capturing 159,522 rats; 60,297 mice, and 8,295 ground squirrels, demonstrating conclusively the correctness of the extermination methods adopted. These rodents are tagged, showing species, sex, and the address where picked up, and promptly delivered to the rodent laboratory, where they are subjected to various tests to determine if they are capable of conveying any contagious disease. No estimate is made or even attempted of

the great number of rats and squirrels destroyed by the distribution of poison baits and the use of carbon bisulphide. In addition to trapping, poisoning, and shooting of rats and squirrels, and with a view to better sanitary conditions in and practical rat-proof construction of all food establishments, personnel of this division inspect all such food depots and pass on them, before permits are issued.

The work of a rodent control unit of any health department, having at its front door a world harbor with a cargo movement of $100,000,000 a year, and maintaining a water front of 25 miles, must be expedited by using the latest approved scientific methods. Control work at the harbor is handled by inspectors quite as astute as the rodents themselves, for with vessels arriving from world ports, even a bandicoot may be expected to escape from one of these ships and find its way ashore. Under existing ordinances coastwise shipping does not come under rigid inspection, excepting when a vessel arrives from a known plague or suspected plague port. Ships from foreign ports are met upon arrival, day or night, by inspectors whose duty it is to see that all lines leading from ship to shore are equipped with approved rat guards; that gang planks are lighted when not in use; and that all crated, burlap wrapped cargo is inspected and the consignees' addresses are forwarded to the office in order that the shipments can be inspected at the time of uncrating or unpacking.

Thanks to modern construction, the wharves at the harbor are built of concrete and the buildings are practically rat-proof, thus facilitating the work of rodent control to a marked degree.

In the eradication work the wharves and a distance of 1 mile from the water front are spread with poison at least once a month, also a line of traps to catch any stray rats that might have escaped from a vessel is kept constantly working under the wharves and in the warehouses. This service, together with the periodical flea survey and the monthly index, affords excellent protection.

The officials at the harbor are to be commended for their untiring efforts in aiding in this all-important work; they are most certainly anti-rat propagandists, and with their coöperation with the local office, rats are being kept to a minimum at this port.

The downtown business section of the city is divided into districts of approximately 4 square blocks, with 1 inspector in each district. He runs 300 official snap-traps daily to supply the laboratory with specimens and to keep up a monthly index of the migration of the rodent population. Scout trappers cover the outlying districts, answering all complaints from home owners, furnishing expert instructions on rat-proofing, rodent destruction, and abatement of rodent nuisances.

Much progress is being made in rodent destruction through coöperation with the Chamber of Commerce and other city departments. For example, the Building and Safety Department furnishes this division with the address of all buildings (at the time permit is requested) to be moved or demolished, thus enabling us to process them with poison baits, destroying all rodents therein, and preventing a spread to the surrounding buildings when these structures are removed to different locations or torn down.

Routine work in the control of ground squirrels entails poisoning, shooting and gassing of them throughout the outlying sections of the city, and is carried on by a squad of 4 inspectors. These men supply the laboratory with specimens and also furnish the material for an excellent ground squirrel index.

A close study of the flea index discloses the fact that fleas appear to be

more prevalent on the ground squirrels during the months of March and April of each year, some animals producing on combing from 30 to 75 fleas each, with *Ceratophyllus acutus* predominating.

In conclusion, it is believed that the work of this division affords the best means of blocking off the entry of rat-carried diseases, and thereby contributes its bit to the protection of the public health.

Los Angeles possesses anti-rodent laws in its General Sanitary Code, parts of which are herewith given:

Sec. 43—Bakeries—All floors, walls, ceilings, and entrances shall be so designed and constructed as to exclude rats, mice, vermin, flies, and other insects.

Sec. 74—Par. B—Restaurants—All floors, walls, ceilings, and entrances shall be so designed, constructed and maintained as to exclude rats, mice, flies, and other insects.

Sec. 104—Meat Markets—Every meat market or meat shop, and every room, building, or place in which meat, fish, game, poultry, or any product thereof is stored, held, kept, exposed or offered for sale for food for human consumption, or manufactured into articles of food for human consumption, shall be so constructed and maintained as to prevent any flies or other insects or any vermin or rodents from entering therein.

Sec. 144—Par. C—Poultry Slaughter Houses—The walls of any such room or place wherein any such rabbits, chickens, turkeys, ducks, geese, and other fowls are slaughtered shall be constructed of cement or asphalt, or any such room or place shall be lined with metal to a height of 6 feet above the floor thereof.

Sec. 208—Par. A—Food Sanitation—The floors, walls, and ceilings of such places shall be well constructed of smooth, cleanable material and so designed, constructed, and maintained as to exclude rats, mice, vermin, flies, and other insects.

Par. G—All articles of food or ingredients thereof used in the manufacture, preparing or mixing of any kind of food products shall be kept thoroughly covered and protected against contamination of any sort, including dirt, dust, rodents, flies, and other insects.

Par. I—All portions of such buildings or premises, including yards, alleys, areaways, waterclosets, plumbing, dressing rooms, utensils, tables, equipment and parts thereof, shall be kept clean, sanitary, and free from dirt or accumulation of rubbish, garbage, refuse, or debris of any sort; suitable garbage and rubbish receptacles shall be provided and kept clean, covered, and in good condition.

Sec. 356—General Sanitation—No rubbish, waste or cast off materials of any kind shall be placed, left, dumped, or permitted to accumulate or remain in any building or place, or on any premises so that the same shall or may afford food or a harboring place for rodents. Every place, room or building where any article of food or products thereof is stored, held, kept, given away, exposed, or offered for sale for human or animal consumption shall be so constructed and/or maintained as to prevent rodents from entering therein and from harboring therein or thereunder. All buildings, places and premises shall be kept by the owner or agent in a clean and sanitary condition and free from rodents.

FOOD AND NUTRITION

The Vitamin A, B, C and G Content of Sultanina (Thompson Seedless) and Malaga Grapes and Two Brands of Commercial Grape Juice—Although the literature has reported raisins as containing little vitamin A, and small amounts of B and C, there is little published on the vitamin content of fresh grapes and grape juice. Thompson Seedless and Malaga grapes were the varieties studied and two types of commercial grape juice, (1) a mixture of Flame Tokay and Zinfandel, and (2) juice from Concord grapes. In both cases, the juice is pasteurized before putting on the market.

In the studies on grapes the basal diet was irradiated to supply vitamin D, and after depletion supplements of Malaga and Sultanina grapes were fed the rats. A small amount of vitamin A was indicated in the two varieties of grapes, but neither of the juices tested showed any indication of this vitamin. The animals died before completion of the experiments, and upon autopsy showed vitamin A deficiency.

The vitamin B (antineuritic) was tested on rats on a diet complete except for the antineuritic vitamin. After a 2-week period the supplements of grapes and grape juice were fed. Five and 6 gm. of the grapes produced the maximum effect of vitamin B, an average gain in weight of 17.5 gm. in the case of Malaga, and in the case of Sultanina an average of 18.8 gm. on 5 gm. of grapes, and 21.6 gm. on 6 gm. portions, showing the grapes are a fair source of the antineuritic vitamin. No measurable quantity of this vitamin could be found in the commercial juices studied.

The vitamin C tests on commercial juice No. 1 were carried out according to the Sherman technic. The tests on the grapes and on the Concord grape juice were made according to the Höjer method. During the 18-day test periods, 10 and 12 c.c. portions of grape juice were fed to guinea pigs and the grapes in 2, 5, 10, and 15 gm. portions.

All of the teeth of the guinea pigs receiving Concord grape juice showed pathological conditions similar to the controls, indicating no appreciable amount of vitamin C. Two and 5 gm. portions of both varieties of grapes did not prevent the pathological changes in the teeth. Ten gm. of grapes showed slight protection but even 15 gm. was insufficient for borderline protection.

In the case of vitamin G, tests on young rats indicated a small amount of this vitamin in the Sultanina but the Malaga grapes and both commercial grape juices did not show evidence of this vitamin.—Esther Peterson Daniel and Hazel E. Munsell, *J. Agri. Res.*, 44: 59 (Jan. 1), 1932.

The Amino Acid Deficiencies of Beef, Wheat, Corn, Oats, and Soy Beans for Growth in the White Rat—Paired rats were used in the study of the amino acid deficiency of these foodstuffs and to determine which combinations of foods would be nutritionally advantageous. Rats were weighed weekly and at the termination of the experiment, lasting from 5 to 12 weeks, body lengths were determined, so as to compare differences in pair mates in body lengths and body weight.

Lean beef at the 8 per cent protein level showed an average of 1.89 gm. daily gain for controls and 2.09 gm. for those with the cystine supplement.

When fed at the 20 per cent protein level, greater daily gains averaging 2.78 gm. were noted, but added cystine resulted in no appreciable effect on growth.

Wheat at the 8 per cent protein level showed no increased growth with the cystine supplement but when lysine was substituted for the cystine the lysine-fed rats gained faster than the controls. With oats at the 8 per cent protein level, the lysine supplement showed 1.38 gm. daily gain against 1.30 for the controls. In the case of soy beans, cystine supplement showed greater gains than the controls and greater body lengths. Corn at the 8 per cent protein level was supplemented with lysine and then with tryptophane, the former showing a small effect. Tryptophane showed no supplementing effect at this protein level. Tryptophane added to a corn ration at the 8 per cent protein level, already supplemented with 0.25 per cent of lysine, resulted in distinct gains in weight and body lengths. Tryptophane added to corn unsupplemented with lysine showed a slight depletion in gain in weight but no effect on body lengths.—H. H. Mitchell and D. B. Smuts, *J. Biol. Chem.*, 95: 263 (Feb.), 1932.

The Relation Between Dietary Cystine and the Growth and Cystine Content of Hair in the Rat—Paired feeding experiments were the basis of the work reported to determine the relation between cystine and hair growth. At the conclusion of the experiment, the rats were killed and and hair completely removed from the body, thoroughly dried and weighed. The hair growth measurement was determined by computing the weight of dried hair per sq. cm. of body surface.

The rats were fed the same rations as were recorded in the experiment of Mitchell and Smuts on amino acids. With beef at the 8 per cent protein level previously supplemented by cystine all pairs exceeded the controls in weight of hair per sq. cm. of body surface as well as in the cystine content of the hair itself. On the 20 per cent protein level, the cystine supplement did not show increased hair growth, but a reduction in most instances.

In the case of the wheat protein, very little difference was noted in the hair growth and hair per sq. cm. in the rats on the supplemented diet. When cystine is added to a diet which is not deficient in this amino acid it exerts no special effect on hair growth and cystine content or keratinization of the hair.—D. B. Smuts, H. H. Mitchell and T. S. Hamilton, *J. Biol. Chem.*, 95: 283 (Feb.), 1932.

The Necessity of Copper as a Supplement to Iron for Hemoglobin Formation in the Pig—The authors having announced in an earlier paper (*J. Nutrition*, 2, 277, 1929–1930) that ferric chloride effected almost as rapid recovery in anemic pigs as iron and copper together, this experiment was undertaken with particular care to eliminate all possible contamination by copper.

Suckling pigs were taken from their mothers at 5 days of age and put into individual wooden pens and given whole cow's milk until they were distinctly anemic. Iron as purified ferric chloride was then given and when no further improvement was shown copper as copper sulphate was added. Hemoglobin was determined weekly. All pigs developed anemia within 4 weeks on the milk diet, and were kept anemic until the hemoglobin decreased to values below 2 gm. per 100 c.c. of blood.

Twenty-five mg. of purified $FeCl_3$ raised the hemoglobin content 5 gm. in 4 weeks. When no further improvement was noted, 5 mg. of copper in addition to the iron effected a rapid improvement in all pigs, hemoglobin values being raised from 3.6 to 12 gm. per 100 c.c. of blood in 5 to 6 weeks at-

tended with increased activity of the pigs.

From this experiment the authors conclude that where experiments report hemoglobin regeneration due to iron alone, there is a probability that the animals are receiving sufficient copper from some other source.—C. A. Elvehjem and E. B. Hart, *J. Biol. Chem.* 95: 363 (Feb.), 1932.

The Effect of Pasteurization on the Bacterial Flora of Low Count Milk—Improved methods of milk production during the past few years have resulted in a marked reduction of the bacterial contamination of raw milk. As a result of the pasteurization of this low count milk certain problems have been developed which were not often encountered when milk of a greater bacterial content was being passed through the pasteurizer. It was noted (1) that such milk frequently does not coagulate even after a considerable period of time, and (2) that the absence of coagulation is oftentimes accompanied by the development of pronounced off flavors and odors.

Studies carried out at the State College of Washington were designed to give information on the types of bacteria surviving the pasteurization of low count milk, the changes occurring in the developing flora subsequent to pasteurization and the relation of this flora to the changes taking place in the milk.

Twenty samples of freshly drawn morning's milk were used in this experiment. Each sample was divided into two equal portions and one portion pasteurized at 142° F. to 143° F. for 30 minutes. Both the raw and the pasteurized portion of each sample were divided again, and a representative sample of each incubated at temperatures of 68° F. and 45° F. respectively.

Each sample under observation was examined for flavor daily, and when an off flavor had developed so that the milk was unfit for consumption it was considered spoiled. Differential and total bacterial counts were made on the raw and pasteurized portions of each sample at the time they were fresh, and again at the time when spoilage was evident. These counts were determined on Bacto-nutrient-caseinate-brom-cresol-purple agar plates, incubated at 37° C. for 48 hours. Acidity and Cooledge score determinations were made on the raw and pasteurized portions of each sample at the time the samples were fresh and at the end of each 24 hours throughout the incubation period. The average bacterial count on twenty samples of fresh milk before pasteurization was 3,467 per c.c., and after pasteurization 377 per c.c.

The bacterial flora of raw and pasteurized milk was divided into three principal groups: (1) Acid-producing types, (2) Proteolytic types, and (3) Alkali forming and inert types.

The differential plate counts showed the comparative percentages of these bacterial groups developing in incubated raw and pasteurized milk.

Percentage Distribution (based on average for 20 samples)

Initial Raw Milk	*Initial Pasteurized Milk*
Group 1 = 26.17%	14.64%
Group 2 = 0.76%	0.62%
Group 3 = 73.07%	84.74%
Raw milk incubated at 68° F.	*Pasteurized milk incubated at 68° F.*
Group 1 = 68.69%	25.51%
Group 2 = 0.038%	23.74%
Group 3 = 31.25%	53.76%
Raw milk incubated at 45° F.	*Pasteurized milk incubated at 45° F.*
Group 1 = 62.15%	11.38%
Group 2 = 11.29%	13.85%
Group 3 = 25.56%	74.77%

The Cooledge score and titratable acidity determinations furnished additional correlative evidence relative to the groups of organisms responsible for the changes occurring in incubated raw and pasteurized milk.

The results of this investigation indicate that when milk of low initial bacterial content is pasteurized, the acid-

producing bacteria are not of major importance in the spoilage of the milk. The results of this examination also indicate that spoilage in this type of pasteurized milk as determined by off flavor and odor without souring may be attributed to the action of the proteolytic and alkali-forming and inert types of bacteria.

The evidence reported in this paper bearing on the groups of bacteria surviving pasteurization and causing the subsequent changes in milk does not fully agree with the results obtained by other investigators. The authors suggest that this disagreement in results may be due to the fact that other investigators have worked with milk of a relatively high initial bacterial content, while this work was carried out with milk of a relatively low initial bacterial content.—L. A. Black, C. C. Prouty, and R. A. Graham, *J. Dairy Sci.*, 15: 99 (Mar.), 1932.

Vitamin B Content of Bread—Previous investigations having indicated the probability that vitamin B in bread is largely dependent upon the amount of yeast, work was undertaken to determine how much brewer's yeast should be added to bread to provide for a sufficiency of this vitamin.

Commercially baked bread containing variations in the quantities of dried brewer's yeast was fed to pigeons. The supplements of dried yeast varied from 0.36 per cent to 1.2 per cent. The pigeons were fed only the bread and water. When no supplement of brewer's yeast was added, the pigeons suffered from polyneuritis. Pigeons which lost weight on yeast-free bread recovered with the bread containing 0.3 per cent dried brewer's yeast, although slower than those which received a supplement of 0.5 per cent.

In one group, pigeons which were fed at the start with 1 per cent yeast supplement, which was then substituted with bread containing 0.3 per cent, showed evidence of malnutrition and one bird had polyneuritis. In other pigeons a decrease from 1 to 0.5 per cent, then 0.3 per cent, showed only slight evidence of vitamin B deficiency.

Another experiment was undertaken to determine the effect of heat and pH on vitamin B activity. The pH of the dough was 5.6 and the finished loaf 5.5, and the temperature in the center of the loaf was 90 to 100° C., during baking, for only a few minutes. Similar results were obtained by feeding this bread with its supplement of dried brewer's yeast as were reported by other investigators who fed the yeast independent of the bread.

From these experiments it was concluded that bread is deficient in vitamin B but this may be supplemented by the addition of brewer's yeast in amounts sufficient for pigeons between 0.3 and 0.4 per cent, and that the pH and temperature in baking do not destroy the vitamin B activity.—Yoshitaka Hashitani and Tsunenaka Sako, *Cereal Chem.*, 9: 107 (Mar.), 1932.

INDUSTRIAL HYGIENE

New Safety Code for Elevators—A revised safety code for elevators has been completed by the U. S. Bureau of Standards and has been approved by the American Standards Association. The code embodies new types of control and additional safety provisions made necessary by the advent of high speed elevators. Elevator buffers have been redesigned and specifications for tests on buffers, terminal stops, interlocks, and safeties have been developed.

The code permits two story elevators to serve two stories at the same time, two operators being used. Provisions are made so that the elevators may not be put into motion unless both doors are closed. The safe operation of freight and passenger operated elevators as well as dumb-waiters and escalators are covered by this code. *Month. Labor Rev.*, 34, 3: 569 (Mar.), 1932. L. G.

Coal Mine Accidents in United States—Recent statistics reported by the U. S. Bureau of Mines for the year 1929 disclose a fatality rate of 3.19 per million tons mined in bituminous mines, a decrease from the year 1928. For anthracite mines the rate was 6.53 an increase over that for 1928. There were 2,187 deaths in coal mines in 1929 yielding a rate of 3.59 per million tons, a decrease from a rate of 3.78 deaths per million in 1928. Monthly Labor Review, 34, 3: 569 (Mar.), 1932.

L. G.

The Impinger Dust Sampling Apparatus as Used by U. S. Public Health Service—This contribution describes the present form of the Greenburg-Smith impinger apparatus as used by the U. S. Public Health Service. The essential portion of the apparatus is the impinger tube and sampling flask or bottle through which air is drawn by means of an electrically driven, compressed air driven, or hand actuated suction device. The method of sampling and analysis of the dust is described in detail. The impinger apparatus has found wide use in the sampling of air, not alone for atmospheric dust but also for chromic acid mist, lead dust and fumes and sulphur dioxide.—Leonard Greenburg and J. J. Bloomfield. *Pub. Health Rep.*, 47, 12 (Mar. 18), 1932.

L. G.

The Measurement of Radiant Heat in Relation to Human Comfort—This interesting and valuable contribution serves to emphasize the importance of radiant heat in the estimation of indoor atmospheric conditions along with dry bulb temperatures, relative humidity and air motion.

In order to determine the radiation heating effect the author experimented with several different types of black body thermometers. The most satisfactory was found to consist of a mercury and glass thermometer inserted into a globe made of thin sheet copper, 6 inches in diameter. The outside of the globe was painted mat black.

Studies made with the copper globe thermometer using a gas fire, stove, and ceiling panels as the source of heat, indicated the subjects to be comfortable at temperatures ranging from 61.4 to 62.9°; these temperatures being the total of the air temperature plus the corrected effectual radiation temperatures. The mean surface temperature of the clothing of the two subjects used in these experiments ranged from 70.8 to 73.6°, taken at 7 points on the body.

Observations made with the copper

globe thermometer with heating sources of various kinds, either stoves, overhead heaters, ceiling panels and underfloor heaters, indicated that, as might be expected, the globe thermometer is to some extent selectively warmed, depending upon the location of the heating source with respect to the thermometer. It is to be noted that with a ceiling panel 9 feet above the globe thermometer the top segment of the thermometer possesses an excess temperature of 2.6° and the bottom segment an excess temperature of but 0.8°. With ceiling panels at a temperature of about 95° radiation is so mild as to be scarcely perceptible to the head of a person sitting directly beneath.

Experiments made in a large lecture hall equipped with a ceiling hot water panel heater and an auxiliary plenum air system showed that negative radiation (cooling) was produced by the cold walls and floor of the room, in spite of the fact that the plenum system was delivering air at a relatively high temperature.

In these experiments it was found that a far more uniform and equable temperature was maintained by the panel heating system when the plenum system was discontinued. The author concludes that "an air current of 270 feet per minute lowered the effectual radiation temperature induced by a gas fire to less than a half, and lowered that induced by a stove to a third of the respective radiation temperatures observed in still air."—H. M. Vernon, M.D., *J. Indust. Hyg.*, Mar., 1932, pp. 95–111. L. G.

Recent Research into the Causes of Industrial Accidents—Although the avoidance of dangerous practices and the guarding of machinery have accomplished considerable good in the prevention of accidents, there is still room for additional measures designed to reduce the frequency of industrial accidents. The author points out that, of the external factors affecting accident causation, fatigue, and poor atmospheric and lighting conditions may be important contributory factors. Accidents appear to be more numerous among younger persons, and among those who experience higher accident rates, the rate of illness is as a rule high.

The personal factors affecting accident causation are discussed by the author, who points out that certain persons are more prone to accidents than are others, and that those having an excess number of trivial accidents, as a rule suffer an excess number of more serious accidents. As a result of recent investigations of accident statistics, it has been possible to construct a very valuable table "by means of which it is possible to determine whether the accident rate of a department is mainly due to factors affecting all members equally or to the fact that it contains certain accident prone individuals." The value of such a procedure is obvious, and it seems equally obvious that great benefit should, at least in certain cases, result from studies of this type.

Psychologic studies showed that persons who failed in certain sensorimotor tests had an accident rate two and one-half times greater than those who had passed these tests.

The importance of complete accident and sickness records is stressed as an aid in the prevention of accidents. In this connection the use of the card index system is preferable in the opinion of the author.—Eric Farmer, *J. Indust. Hyg.*, 14, 3: 84 (Mar.), 1932. L.G.

CHILD HYGIENE

THE day peculiarly the child's own is May Day. During the past 8 years the interest and attention of the nation have been gradually drawn to a specific consideration of children's health needs upon that day. One city that was particularly interested in May Day in 1931 was Springfield, Mo., and it developed this interest in a "May Day Conference" during a period of 3 days. The Parent-Teacher Association sponsored the program.

Committees were planned after the manner of the White House Conference Committees, but the studies made were confined to the city of Springfield. Committee A was called "Healthful Living Through the Twenty-four Hour Day," and was composed of 5 sub-committees. One of these sub-committees was on the "Home's Contribution to Health Education," and had a parent for chairman. The other 3 members were a school nurse, a classroom teacher, and a principal. The chairman sent a letter to 61 principals and teachers, representing 21 schools, asking each teacher to call a meeting of parents of the children in her room for the purpose of getting facts regarding home health habits of their children. Three hundred and ninety-seven mothers attended and 1,313 children were represented.

The mothers were asked to list facts about the health habits of their children while at home, and the following tabulated results came from these meetings:

Health habits being practiced in the home	129
Health habits which, in the parents' opinions, are difficult to establish	101
Health habits with which the mothers wish aid	71

From this material the committee reached 4 definite conclusions, and made the recommendation that "Some form of health education be established whereby parents may get a better knowledge of how to direct their children in desirable health habits—mental, emotional, social, and physical." The committee goes on to give a detailed plan of how this may be done in Springfield, Mo. This is an excellent program because it is an outgrowth of their own study, stimulated from without by a national organization and by the White House Conference, but adapted to their own needs.

Portland, Ore., observed May Day in a variety of ways. One of the most far reaching of these was a series of 18 radio talks on the points of the Children's Charter, sponsored by the Portland branch of the American Association of University Women, and broadcast over KGW. Each talk was definitely tied up with the White House Conference.

County nurses, May Day chairmen, and others organized groups of mothers and clubwomen all over the state to listen to these broadcasts, scheduled from March 21–April 30. At club dinners and Health Association dinners and at school exercises the White House Conference was also the principal topic of the speakers.

Newspaper advertisements in the leading Portland papers contained frequent references to May Day—Child Health Day. The official *Bulletin* of the Portland churches with its series of May Day articles also reached many people. Newspapers, stores and other business firms, as well as men's and women's clubs, took an active part in spreading the May Day message of child health.

The School Division of the City Health Bureau coöperated with the Parent-Teacher Association in a huge Summer Round-up of the children. At 45 clinics 1,026 children were examined—an increase of 319 over last year. In almost every instance the mothers accompanied the children to the clinic and received advice and recommendations from the physician.

Visiting nurses, doctors at the infant welfare conferences and visiting teachers sponsored special projects and talks on child health. A new step was taken by the Visit-

ing Nurse Association in its May Day talks to student nurses at 2 of the hospitals. At 2 of the libraries meetings were held for prospective mothers, and the Portland Library Association displayed announcements and posters on May Day, and recommended children's books and books on child care. At the Marshall Street Community Center where the regular monthly meetings for mothers had their origin in an earlier May Day, there were programs for both mothers and children. The Neighborhood House also gave its annual May Festival.

The Portland League for the Hard of Hearing held a meeting on May 2 reporting on what the organization is doing for the handicapped child. Through the Girl Scouts, Camp Fire Girls, 4-H Clubs, Young Men's Christian Association and Young Women's Christian Association many hundreds of young people and their parents observed May Day in health contests and Play Day events.

Close on the heels of May Day, comes Mother's Day, which the Maternity Center Association of New York City would turn into something better than an occasion for greater commercial activity throughout the country. It suggests that the practical demonstration of affection for the mothers of the country would be to assure them safety in becoming mothers and strength and health afterward. Its efforts have not extended over so long a period as those for the observance of Child Health Day, having been started only in 1930, but they are equally deserving of attention.

The association calls attention to the fact that the puerperal death rate in the United States is unnecessarily high, that it can be reduced greatly by adequate and skilled obstetric care, and that the public should be educated in the essentials of such care. It has sent out material to daily and weekly newspapers, magazines and trade journals all over the country; the Metropolitan Life Insurance Company, the Borden Company, and Parke-Davis Company devoted newspaper and magazine display advertising to the importance of adequate maternity care; governors and mayors issued proclamations and health commissioners wrote articles and broadcast over the radio; ministers preached sermons regarding better maternity care.

This year the Medical Society of the State of New York is taking the lead in that state to teach the public the need for adequate maternity care. This society approved a plan to send every physician in the state copies of a leaflet for distribution to patients, entitled "A Message to Expectant Mothers and Fathers from the New York State Medical Society." This circular outlines the fundamentals of maternity hygiene advising medical care from the time the woman believes she is pregnant until the doctor says she is able to resume her regular activities and responsibilities and to care for her baby.

These leaflets are not being sent to physicians directly by the society, but through the coöperation of the Maternity Center Association of New York City. A letter accompanies the circulars offering to send physicians additional quantities if desired, and the response from the medical profession is very favorable.

PUBLIC HEALTH NURSING*

County Public Health Nursing in Texas—The area of Texas is approximately the same as the combined areas of Wisconsin, Michigan, Illinois, Indiana, Ohio, and Kentucky. Few realize the vastness of the state whose climate ranges from the semi-tropical in the south to ice and snow and frosty winter winds in the north. In the west are the prairies and plains where cities and industries are fast developing, in the east is the pine country with its cotton fields and large negro population.

Texas has 254 counties within its borders. Forty of these have full-time county nursing services. There are 200 counties left which have no organized public health nursing service.

It was the Texas Congress of Parents and Teachers which years ago petitioned the legislature for a Bureau of Child Hygiene in the State Department of Health, and it was successful. As in many other states, the American Red Cross helped this department get started by financing and supervising county nursing services jointly with the state. During the first year of the bureau, the University of Texas had a School of Public Health Nursing and trained 58 public health nurses who were placed in counties throughout the state. From 1921 to 1929 federal money which came to Texas through the Shepherd Towner Act helped greatly to expand local public health nursing services. Since then the State of Texas itself has financed the nursing program. The bureau's plan now is to put as much money as possible directly into nursing services in the various counties, and in order to stretch the appropriation over as large a territory as possible, the counties are asked to match the state and federal funds for this work. Since May, 1931, also, 22 public health nurses have been serving in 100 counties in the drought area of Texas on emergency funds from the federal government.

The state does not inaugurate public health nursing services in a county unless there is a nursing committee formed to be "additional arms, legs, and brains to help with community health problems." This committee promotes the work of the county nurse and interprets the public health nursing program to the people. It is made up of representative people such as the county health commissioner, the county superintendent of schools, the chairman of the county council of parents and teachers, and others. A field supervisor of nursing is provided by the state bureau to assist in organizing county committees and nursing organizations and to give every help possible to the nurse when she is employed.

In order to show the great number of counties in Texas which had never had public health nursing services what they could accomplish, 2 years ago a special appropriation was made by the legislature to the Bureau of Child Hygiene, which provided for 4 white and 2 negro state itinerant public health nurses. The state finances these itinerant services entirely and the nurses stay from 4 to 6 weeks in a county. In order to have these nurses the counties must meet certain definite requirements: (1) a written request for the service must go to the State Department of Health from certain officials and representatives of certain service clubs; (2) an endorsement and request must come

* Please send printed matter or other material relating to public health nursing to Eva F. MacDougall, 6 State House Annex, Indianapolis, Ind.

from the county medical society; (3) a county health committee must be appointed by the county court to assist the nurse; (4) the county must furnish incidentals needed in the nurse's work, and an office.

The negro itinerant nurses work entirely with their own race, and they have received wonderful coöperation.

The American Red Cross has also furnished itinerant nursing services in Texas for several years. The Red Cross itinerant nurse remains from 3 to 6 months at a time in a community. Her salary and other expenses are paid by the American Red Cross, and the Chapters receiving the service reimburse the national office.

As a result of the itinerant nursing services, several counties have employed full-time nurses. Many of the other counties which have had a taste of this service are determined to continue to work for an appropriation to finance a full-time nurse. Counties are sending in more requests for itinerant nurses than the state can grant. The itinerant nurses have "provided an opportunity for the general dissemination of individual education in public health, the value of which cannot be measured by statistics or during a single generation" in counties that have previously showed no concern about public health matters.

REFERENCES

H. H. Barnett and L. E. Ledbetter. Generalized Public Health Nursing in Texas, *Pub. Health Nurs.*, XXIV, 3: 131–133 (Mar.), 1932.

Katherine Haquist. Itinerant Nursing in Texas, *Pub. Health Nurs.*, XXIV, 3: 134–136 (Mar.), 1932.

Myra F. Cloudman. Health Work in Texas Under the Red Cross, *Pub. Health Nurs.*, XXIV, 3: 140 (Mar.), 1932.

The Public Health Nurse and Rural Sanitation—Recently the Sanitary Engineering and the Public Health Nursing Departments of the Indiana State Board of Health held a Sanitary Institute for public health nurses in southern Indiana. The nursing department in preparing its part of the program searched through a great many books and public health and nursing magazines for material on this subject as it applied specifically to public health nurses. Almost nothing was found.

On a recent visit to the Tennessee State Health Department at Nashville the matter was discussed with Malvinia Nisbet, Supervisor of Public Health Nurses, and she mentioned a paper which H. S. Mustard, M.D., of the Tennessee State Department of Health had read at a Regional Health Workers' Conference held in Tennessee in 1931. Dr. Mustard gave the following as duties and opportunities of the public health nurse in a county health department in the execution of an environmental sanitation program:

1. To gain a clear understanding of the scientific basis of sanitation as it relates to prevention of specific diseases.
2. To gain a clear understanding of the sanitary problems of the area as a whole, of every community, and of each home visited.
3. To gain a clear understanding of the sanitation program in all its phases, both as to policies and procedures, and also as to technic.
4. To integrate each visit directly or indirectly with the need for sanitation. In one way or another this is possible with every service rendered by the public health nurse.
5. To exert a special effort, in cases where communicable diseases exist, to insure immediate provision of sanitary improvements: protected water, milk control, proper excreta disposal, insect exclusion, or even the wearing of shoes in hookworm families.
6. To assist intelligently, interestedly, and tenaciously in discovering the source contacts in those diseases whose spread is associated with defective environment. This applies particularly to painstaking investigation in connection with typhoid fever. Often a nurse, through the woman of the house, can gather information and can obtain stool and urine specimens, where others would be unable to obtain this material for laboratory examination.
7. To teach in the home the essentials of milk and food sanitation. Such instruction may vary from protection of food from flies to removal of the privy from the vegetable garden.
8. To teach in the home the use and care

of screens and to demonstrate the patching of screen wire.

9. To teach the importance of safe excreta disposal and safe water, and to explain how these improvements may be brought about.

10. To make a sanitary survey of every home visited, go over the existing situation with the woman of the house, to make to her recommendations for improvement, recording findings on Form No. 300, and routing this record to the files through the sanitary inspector.

REFERENCE

Papers presented at Regional Health Workers' Conference, Tennessee Dept. of Public Health, Second Annual Meeting, 1931, p. 52.

In Indiana where there are no full-time health units, the county nurse is the only full-time paid health worker. It is doubly important for her to know both content and methods in sanitation. At this Indiana Sanitation Institute which was attended by 25 public health nurses, great emphasis was placed on the fact that the public health nurse's part in a community sanitary program is chiefly education, and not administration or enforcement of laws.

Far reaching results are bound to come from this institute as illustrated by two letters that have recently come from two of the county nurses who attended. One wrote that she hesitated long before she decided to drive the 100 miles to attend, but she felt more than repaid by the help and suggestions she obtained. Along with her letter she sent an order for 500 copies of bulletins on water, milk, and sewage sanitation, to be used as textbooks in her adult Red Cross Home Hygiene classes.

Another county nurse, working in one of the counties having the highest death rate from typhoid, writes:

> I have a lot of ideas I want to put into action that I got from the Sanitation Institute. At my last county nursing committee meeting we started a whispering campaign about sanitary privies. At first the women thought it was very funny, but after we had looked at the maps and graphs and discussed them they decided the matter should not be whispered but fairly shouted.

The School of Nursing and Fundamental Needs in Public Health Nursing—Studies have shown that approximately 85 per cent of all sick people are cared for at home, so it is very important that nurses be prepared to adjust themselves to home situations. Nearly all public health workers and private duty nurses work in the homes, and this throws a challenge on the nursing schools to give their students the preventive as well as the curative point of view.

In our present system of nursing education nursing schools, for the most part, avoid the field of preventive medicine in their plan of instruction, probably either because it is not considered fundamental in the training of the nurse or because the instructors and nursing staff are not abreast of the progress in scientific thought. They apparently feel that the nurse who is going to specialize in public health nursing can gain the public health point of view in her postgraduate course. But the nurse should have this before she takes the postgraduate course.

The private duty nurses need the public health point of view also, and since they do not take postgraduate courses in public health nursing they often never obtain it. This is serious, as there is no dividing line between sickness and health and the public expects every nurse to be a health teacher.

If it is important for the nursing school to be concerned about the quality of its health teaching it is just as important for the public health nurses working in a community to inspire and influence the teachers and instructors in the nursing schools along public health lines. Often the public health group isolates itself and fails to take advantage of its opportunities to demonstrate public health needs to the nursing school staff.

The nurse who practises in the home must be skilled in her art. Too many

nursing schools teach the nurse how to do perfect work with the fine equipment in the hospital without showing her how to adapt nursing measures to the different and often inadequate equipment in the home. It is considered desirable to teach home nursing to lay groups, and how much more necessary it is that student nurses be familiar with the course and its practical application!

The care of the sick at home requires a nurse who can teach nursing. The visiting nurse must instruct the family to give nursing care between her visits. The nursing school cannot train her completely to do this but it can create the right attitude towards teaching as follows:

1. Prepare the nurse carefully in the details of nursing practice, emphasizing the why and wherefore of the procedure and not the mere mechanics.
2. Include in the classroom demonstration procedures applicable to home use.
3. Encourage the student to develop team work in the care of the sick.—

Clara B. Rue, The School of Nursing and Fundamental Needs in Public Health Nursing, *Am. J. Nurs.*, XXXII, 3: 311–315 (Mar.), 1932.

EDUCATION AND PUBLICITY*

How Do Local Editors Rate Public Health as a Source of News?—Can you cite examples of incidents, unusual situations or other experience that would make good newspaper feature stories?

What does the buyer of printing need to know and to do to get the best results from the printer and to cut the costs?

Is the impression made on the reader by your annual report mainly one of quantity of work done or is the quality brought out also?

The above questions are selected at random from "A Brief Course in Social Work Publicity" which was prepared by Mrs. Routzahn for informal study groups of public health workers and social workers. The course consists of outlines for discussion and clinic examples on News Stories, Newspaper Feature Stories, Social Work Case Stories, Appearance of Printed Matter, Annual Reports and Letters and Letterheads.

If you are interested in organizing a group for a series of from six to ten 1-hour or 2-hour sessions on publicity methods, write to Mrs. Mary Swain Routzahn, Russell Sage Foundation, 130 E. 22d St., New York, for further information.

Is It a New Idea?—Health ideas expressed years ago, or methods used in the "once upon a time" have been noted in this department as a reminder that all that is good is not new and original with this generation of public health workers.

Recently several who had been in tuberculosis work 25 years ago held a brief reunion, with several "youngsters" present. One of the latter acknowledged learning that a recently "discovered" publicity method had actually been used in that far off period. This led to the mention of various campaign methods of today which had actually been used 20 to 25 years ago in the first educational campaigns of the National Tuberculosis Assn. One of these was the contribution of paid advertising space. The "whispering" or "talk-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

ing" campaign used by several community chests in the last 2 years was put on in two or three cities 20 years ago. A recently discovered article by one member of the luncheon group, published in 1895, outlined the main elements of the campaign project as it is now conducted for health and other purposes.

The group of oldsters included P. P. Jacobs of National Tuberculosis Assn.; Ernest D. Easton of New Jersey Tuberculosis Assn.; George Nelbach of State Charities Aid Assn.; Evart G. Routzahn, one-time the original educational campaigner of the National Tuberculosis Assn.

Were You Among the Few or the Many?—The "few" were those who did send back to the editor of this department the form asking their judgment upon the interest appeal of what appeared in the department. The "many" were most of those members of Public Health Education Section who received that request.

However a single response regarding the February, 1932, issue made the sending worth-while. Some of his 3 pages of typewritten comment will be published. Here is his scoring: "Interesting?" "Yes" for 4 items; "not much" for 3 items; "no" for 4 items (one "ordinarily, yes"; 2 "because we are not mentioned").

After a few more tests we will report the full vote, *and some of the topics will be dropped.*

Is It Fair?—Particularly in these days of close budgeting of postage and printed matter is it fair to mention in reading lists publications intended for distribution to the teachers or to citizens generally in a given city or state? Within a few months one state health department received requests from 22 cities outside the state for supplies of its health educational material. Some requests went as high as 50 or 100 copies. Nearly every reference list for teachers names some publications to which individual teachers are not entitled. And some department lists suggest that mothers write to departments in other states for specified publications!

For the Busy Teacher—The Board of Education of New York City has distributed to its teachers three manuals of unusual conciseness and completeness in detail. Unfortunately the edition is too limited for outside distribution. But we have secured a few sets to be *loaned to those who send the editor of this department 5 cents postage and a promise to return the set in 10 days.*

The general title: Supplementary Materials And Suggested Activities To Be Used With The Course Of Study And Syllabus In Health Education For Elementary Schools. There are three separate editions—for grades 1A–3B, 4A–6B, and 7A–8B.

We don't attempt to pass on the teaching values, but as reference manuals they have points especially worthy of mention. Each is brief (14 to 17 pages); stiff cover; a page of "Materials" is faced by a page of "Suggested Activities" for "All Grades," and separately for each specific grade; for every reference to "Material" there is an address, and for nearly every reference there is a price or "free"; the references are grouped under "Teachers," "Children," and "Posters" (so few lists differentiate between background material for teachers and material to be used directly with the pupils); "Starred items form a good minimum library"; double stars indicate "Of unusual value for anyone interested in health education"; 9 items listed are priced at 10 cents to 35 cents, one at $1.25, *all others are 5 cents or less, or are free.*

Under "Suggested Activities" there are frequent notes in italics, such as

"This activity helps to . . . ," "This activity emphasizes . . . ," etc. We commend this publication to all who make up reference lists for its conciseness, clearness, accuracy and uniformity in arrangement, all of which help the busy, busy teacher. It was prepared by a committee of special health teachers, under the direction of Dr. I. H. Goldberger, assistant director of health education, with the coöperation of Mrs. Elizabeth Semenoff of the Bronx Tuberculosis and Health Committee and Mrs. K. Z. Whipple of the New York Tuberculosis and Health Association, which agency published the pamphlet.

They Object to Repeaters—At the Montreal business meeting of the Public Health Education Section some general policies were formulated as reported below by Chairman Ira V. Hiscock of the Nominating Committee:

The Nominating Committee of the Public Health Education Section, in submitting its recommendations for officers and Council members for the ensuing year, made certain suggestions regarding future policies. It is believed desirable that as the terms of present Council members expire, new Fellows be elected to the Council in order that new viewpoints may be secured regarding program building, section functions and opportunities. It is assumed, however, on the basis of past experience in the section, that former Council members will continue to participate in section activities. Another suggestion was to the effect that there should be no "promotion" plan from one section office to another. In other words, officers should be selected each year on the basis of what, in the judgment of the Nominating Committee, and in the light of circumstances, would promise the most useful working group for the coming year.

A Public Health Teacher—One phase of the work of the district health officer described in *Public Health News* (Jan., 1932), New Jersey Dept. of Health:

Public health education is an activity in which the district officer takes an active, personal part. He furnishes the press of his district with facts and news items, gives talks to interested groups, and arranges for the distribution of literature published by the department. His discussion of public health matters includes tuberculosis as well as the other communicable diseases. He should be a valuable aid in keeping the inhabitants of his district health-conscious and in guiding the public away from the fads, cults, and nostrums, to sound preventive and curative measures.

What Other Teachers Are Doing—So far as we know, the "Health and the School" department of *Hygeia*, 535 North Dearborn St., Chicago, is the most accessible record of current actual classroom practice in teaching health. A section of the department reports on "New Health Books and Teachers' Materials." And the body of the magazine carries a wealth of material for all who teach—or speak or write on health topics. Since a free sample copy will be sent upon request we need not go into detail. But we do want to quote the following:

A Scientific Spirit in Health Education—After a brief discussion of health superstitions, ancient and modern, the editor, J. Mace Andress, says:

The human body has such remarkable vitality and power of adjustment that in many instances it cures itself. To the quack and his followers this leads to the conclusion that many a cure is due to their particular remedy. But science rests on the combined and compared experience of many students who often devote their lives to particular problems. Their findings are checked, tested and tried thoroughly before they are used in the treatment of human ills or in promoting positive health.

Here is a text of much needed popular education. Dr. Andress makes the application to the classroom through a description of some new texts from the University of Texas which we have not seen.

DIPHTHERIA

"Diphtheria: Michigan Death Rate 1901–1930," *Public Health*, Michigan Dept. of Health, Lansing. Dec., 1931. Effective diagram.

"The Fight Against Diphtheria," editorial. *Journal*, American Medical Assn., 535 N. Dearborn St., Chicago. Review of progress. *Ask for clip sheet.* Free.

"Depression Hits Diphtheria" (lowest previous record in New Jersey practically cut in half in 1931). *Public Health News*, Trenton. Jan., 1932.

The New York City Dept. of Health supplies a diphtheria warning notice for physicians to mail to parents of children under 5 years of age.

TRAINING COURSES

Prof. C. E. Turner will give a 6 weeks' summer course in health education at University of Hawaii. Opens June 29.

A course for high school teachers will be given during the spring term at Massachusetts Institute of Technology.

A summer course for teachers of fresh air classes will be given at Teachers College, New York, by Prof. H. G. Rowell and Louise Strachan.

In common with other state tuberculosis associations the Florida Tuberculosis and Health Assn. held three institutes for public health nurses and medical social workers. The first of the series was given in connection with the annual meeting of the association.

"The Illustrated Lecture: Some Do's and Don'ts in Poster and Project Teaching," by L. K. Wolf. *American Journal of Nursing*, 450 7th Ave., New York. Jan., 1932. *35 cents.* Illustrative material prepared by the teacher; material prepared by the student; assembling project material; essentials of a good poster; weaknesses of a poor poster.

Those who are concerned with training on the job for public health workers of various types would be interested in "Forthcoming Lectures And Training Courses" in *Mother and Child* (formerly *National Health*), 5 Tavistock Sq., London, W. C. I., England. In the Dec., 1931, issue were listed courses and lectures given by 14 organizations ranging from Natl. Assn. for the Prevention of Infant Mortality to Royal Institute of Public Health.

LISTS

"Directories of State and City Health Officers, 1931." *Public Health Reports*, Washington, D. C. Dec. 4, 1931.

"State and Local Social Hygiene Societies in the U. S." *Journal of Social Hygiene*, 450 7th Ave., New York. Jan., 1932. *35 cents. Reprint, 10 cents.*

"Whole-Time County Health Officers, 1931." *Public Health Reports*, Washington, D. C. Dec. 18, 1931.

MOTION PICTURES

1000 and One: The Blue Book of Non-Theatrical Films. *Educational Screen*, 64 East Lake St., Chicago. 8th edition. 144 pp. *75 cents.* Classified under 136 headings, including "Physiology, Health and Hygiene." Both 35mm and 16mm. Useful for sanatoriums and other institutions using any non-health film.

Several 16mm motion pictures, including amateur film, will be displayed at headquarters of Social Work Publicity Council, during the National Conference of Social Work, Philadelphia, May 15–21, 1932. *An amateur health film is desired.*

For the first time a sound trailer is offered in addition to the silent trailer for use in the 1932 Early Diagnosis Campaign during April.

Social Hygiene Motion Pictures, by American Social Hygiene Assn., 450 7th Ave., New York. Revised list. *Free.* Condensed easy reference data. For example:

Title of film (The Gift of Life); Subject (biology of sex and reproduction); Type of film (narrative and diagrammatic); Suitable for use by (teachers and lecturers); For groups of (adults and young people); Synopsis (Under the guidance of a scientist, a boy . . .); No. of reels (4); Purchase price (35mm $170; 16mm $120); Rental per day ($4.00).

Several pictures on milk, milk production, fruits and vegetables, are offered for charges both ways by Motion Picture Service, International Harvester Co., Chicago.

ADDITIONAL DIET MATERIAL

Current background material and material for copy is easily available.

"Food and Health:" A Study of Consumers' Habits, Editorial. *Journal* of American Medical Assn., 535 N. Dearborn St., Chicago. Feb. 13, 1932.

"Limited Living." *Monthly Bulletin*, Bureau of Health, Rochester, N. Y. Dec., 1931.

"The Bartlett's Beat The Depression." *Health Bulletin*, North Carolina State Board of Health, Raleigh. Jan., 1932.

"How to Feed The Home Folks In Hard Times." *Commonhealth Bulletin*, Health Council, Citizens' Aid Bldg., Minneapolis. Dec. 15, 1931.

"Living Up To The Food Budget." *Connecticut Health Bulletin*, State Dept. of Health, Hartford. Feb., 1932 (radio).

"Emergency Nutrition Special." *American Child Health News*, Jan., 1932. Out of print.

Journal of Home Economics, 101 E. 20th St., Baltimore. Feb., 1932. *30 cents.* Several articles.

PLAYS

A revised edition of Plays About Social Problems lists the plays available for adult performers which have come to the attention of the Social Work Publicity Council, 130 East 22d St., New York. 5 pp. *10 cents.* Synopsis of each play and how to secure copies. Includes "From House to House" (visiting nurse), and "My Son John" (mental hygiene).

SCHOOLS—CHILDREN

Scientific background material is contained in *Health Bulletin For Teachers*, Metropolitan Life Insurance Co., New York. *Free.*

In one issue of *School Health Bulletin*, Illinois Tuberculosis Assn., Springfield, addresses are given for securing mentioned printed helps; in another issue, no addresses are given for Office of Education and Children's Bureau. Will all teachers remember these addresses?

"Is There a Formula for Sex Education?" introduces several charts used by Professor T. W. Galloway in the last training institutes conducted by him. They outline concisely what children and young people "should acquire," the three parallel columns being headed "In Knowledge," "In Habits," "In Tastes, Preferences and Attitudes." This material is grouped for "the first 6 years of life," "at the age of 12," "during junior high school," "senior high school youth."—*Journal of Social Hygiene*, 450 7th Ave., New York. Feb., 1932. *35 cents.* In the same issue: Report of the Sub-Committee on Social Hygiene of the National Conference on College Hygiene," taken from Proceedings of the conference held in May, 1931. Full report published by National Tuberculosis Assn., 450 7th Ave. New York.

BOOKS AND REPORTS

Courts and Doctors—*By Lloyd Paul Stryker. New York: Macmillan,* 1932. 236 pp. Price, $2.00.

This useful book is the work of a well known lawyer who served for many years as counsel for the New York State Medical Society and as editor of the legal section of the state medical journal. As the result of a rich experience in defending physicians against malpractice suits, in rendering other valuable legal aid to them, and in writing pertinent monthly comments on the subject, the author has constructed an excellent non-technical treatise on law for practising physicians, who are the rankest of laymen when jurisprudence is involved.

With the exception of a somewhat paternal and rather long-winded introduction, the book is interesting and practical, and it ought to do much to clarify the legal relationships between doctors and their patients.

Since the book contains nothing at all on public health law, sanitarians will find it valuable only if they are also in active private practice. The book is well printed, has an index, and is written in a pleasing conversational style. The references and citations for each chapter are assembled at the back of the book, which makes their utility almost nil.

JAMES A. TOBEY

Industrial Hygiene for Engineers and Managers—*By Carey P. McCord, M.D., assisted by Floyd P. Allen, M.D. New York: Harper,* 1931. 317 pp. Price, $5.00.

The specialist in industrial hygiene has been favored in his reference work by being able to refer to the excellent text of Kober and Hayhurst. This is now the standard text in the English language for the industrial specialist.

The large group of plant engineers and managers, men who are in vital, everyday need of help in this field, have, however, up to this time, not been so fortunate. The present volume by Dr. McCord and his associate, Dr. Floyd Allen, fills this need of plant officials most admirably.

No longer is industry content to hire men, put them to work under conditions of an adverse or even unhealthy environment, and to discharge them when they are ill or incapacitated.

The present volume clearly brings out the many-sided nature of the problems of industrial hygiene, and shows how these problems may be solved. In the modern factory the worker is given a physical examination after being hired, and is placed at a task for which he is mentally, physically and professionally suited. His environment, as well as the machinery with which he works, is supervised so as to eliminate, in so far as possible, causes of accidents, and the materials with which he is brought into contact are selected so as to avoid the use of poisonous substances, or they are controlled so as to prevent the occurrence of actual cases of poisoning. Dr. McCord and his associate discuss all of these phases of industrial hygiene in a manner which should give the officials of even the very small plant an opportunity to institute the procedures which the larger plant is enabled to obtain by virtue of its more complete functional organization.

Even under ideal conditions, industrial hygienists recognize the occurrence of the "unavoidable" accident, which makes the provision of the emergency

hospital or dressing station a necessity in every plant. In the chapters devoted to the "medical department in industry," "emergency aid," and "bandaging for the industrially injured," the reader is told not "what to do" but actually "how to do it."

Nor is this the complete scope of the volume at hand, for in addition to the above, there are presented well balanced discussions of the rehabilitation of the injured employee, both monetarily (compensation) and physically. Finally, it should be pointed out that the book is written from the preventive viewpoint, a viewpoint characterized by excellently written chapters dealing with accident prevention, protective garments, dental service, the economics of human conservation in industry, food for the industrial worker, and industrial mutual benefit associations. Engineers and officials of large industries will find this volume of inestimable value and the single chapter devoted to "Health Promotion in the Small Plant" should compel the officials of every small plant to own a copy of this book.

LEONARD GREENBURG

Manchurian Plague Prevention Service Reports, 1929–1930. *Anti-Plague Institute, Harbon, China,* 1931. 232 pp.

The Manchurian Plague Prevention Service was established directly after the severe plague epidemic in 1910 and 1911 (60,000 deaths). It has been in existence sufficiently long and without interruption by internal chaos to build up an extensive organization with facilities for hospitalization, field investigation, laboratory research, and epidemiological control. During quiescent periods the organization serves the people in the vicinity of its hospitals in ordinary ways. Formerly an independent service, this seventh biennial report announces its absorption into the National Health Administration.

The second extensive plague epidemic occurred in 1920 and 1921 (9,000 deaths). Another was expected at the end of the decade in 1930 and 1931, but failed to appear. The reasons given for this are: the depletion by wholesale hunting of the tarabagan, which species constitutes the animal reservoir of plague, and better precautionary measures taken by the hunters at the instigation of the Plague Prevention Service. Recently when sporadic cases of plague occurred, most of them were of the bubonic type. Formerly the Service had to fight directly the wild rodents in sparsely populated regions, but now, with Manchuria's population rapidly increasing, it has to deal with the ubiquitous rat in crowded settlements as a potential menace.

This report of the 19th year includes a number of scientific papers by members of the Plague Prevention Service on subjects other than plague. One cannot but wonder, while reading this excellent presentation, under what auspices forthcoming reports on plague prevention service will be issued in view of present developments in Manchuria.

W. W. PETER

Foods in Health and Disease—*By Lulu G. Graves. New York: Macmillan,* 1932. 390 pp. Price, $3.50.

This simply and clearly written text is a concise and up-to-date encyclopedia of common foods with data on the nutritive properties of each. The first section, devoted to foods in health, contains descriptions of the various vegetables, fruits, sugars, nuts, animal foods and dairy products, fats and oils, beverages, and food accessories. The second section takes up foods in disease, including such matters as overweight and underweight, infection, nephritis, gout, arthritis, epilepsy, gastrointestinal troubles, diabetes, deficiency diseases, diseases of circulation, and the allergies. Several appendices give tables of vita-

mins and edible organic nutrients. The book is adorned with numerous excellent illustrations and probably as a consequence is printed on a heavy, glossy paper. Each chapter has a bibliography and there is a good index. The book will be of value to all students of viands, victuals, aliments, comestibles, and pabulums. JAMES A. TOBEY

A System of Bacteriology in Relation to Medicine. *Vol. VI. London: His Majesty's Stationery Office,* 1931. 538 pp. Price, $6.00. Postage extra.

This volume is one of the most interesting of the series so far published. The first chapter considers the relation of bacteria to disease. The other 16 treat of immunity from all angles, beginning with the problems of natural immunity and treating of toxins and every phase of the question which one can think of. It is a comprehensive study of this tremendous and important question, though it does not include all of the knowledge which has been accumulated concerning active immunity, antigens, and antibodies. The first chapter is the only one which can be criticised seriously. It strikes us as inadequate, treating the subject of aggressins, for example, in an incomplete manner. The last chapter gives a survey of the field of chemotherapy.

The peculiar strength of this volume lies in the enumeration of questions which arise in regard to most of the subject matter. The problems of research in immunology are so numerous and the data often so unsatisfactory that we cannot but value highly the suggestions and analytical approach to their solution here given.

The volume as a whole is excellent, though there is some lack of balance in the various chapters, which are written by different authors, some treating their subjects too briefly and others indulging in unnecessary repetition. Excellent but not exhaustive references to literature are appended to each chapter.

An index would probably add too much to the expense, and one for the entire system will doubtless appear in the last volume, but reading and study of individual volumes would be easier if each had its own, though this is a minor fault, since the Table of Contents gives an excellent analysis of what each chapter contains.

The printing and make-up are excellent. We consider this volume as worthy of those which have gone before, and the whole series as indispensable to any student of the enormous subject which is covered.

MAZŸCK P. RAVENEL

The Vitamins—*By Ethel Browning, M.D. Baltimore: Williams & Wilkins,* 1931. 575 pp. Price, $10.00.

This is Volume I of a series entitled "Monographs of the Pickett-Thompson Research Laboratory." It not only treats of the biochemistry of the vitamins, but also of the clinical and experimental aspects. For this reason the work will be of interest not only to the student and biochemist, but also to the dietitian and clinician.

The book is divided into 3 main parts: the vitamins in general, the fat-soluble vitamins A, D, and E, and the water-soluble vitamins B and C. The historical sketch is followed by a review of the literature on the origin of the vitamins and the problems relative to their synthesis. Their mode of action is presented as postulated under the theories of hormone action, acceleration of tissue oxidations, maintenance of mineral equilibrium, and regulation of trophic changes. There are few aspects of the vitamin problem that are not adequately presented.

This is no mere compilation. It is exceedingly interesting because it has not merely followed a definite order, but the present conflicting knowledge is

given in a manner to offset completely the usual tedium attending the reading of such a treatise. The widely accepted classification of the vitamins according to their connection with specific disorders of the body has fortunately been followed.

Though this work is fairly complete, it does not include the entire literature, and for that reason the author has added a bibliography which contains references to papers not mentioned in the text, as well as to those that are. A very valuable part of the volume is that composed of tables showing the vitamin content of foodstuffs, which include the B_2 and E.

It is regretted that references in the text are not numbered to correspond with a number in the bibliography, or that the authors in the text are not given their initials. It is often confusing, where authors have the same name, and one has to hunt through a long list to find the desired reference.

The book is most valuable and the work excellently done. The printing is of the best. All interested in this most vital subject are under a debt to the author, Dr. Browning, as well as to the institution which sponsors the publication. ESTHER W. STEARN

Malaria Control by Anti-Mosquito Measures—*By Gordon Covell, M.D. London: W. Thacker & Co.*, 1931. 148 pp. Price, $2.00.

As the result of extensive experience in malarial countries, the author has given us an excellent account of the measures which have been suggested and tried for the control of mosquitoes. The book is divided into 3 principal parts, taking up respectively protection against bites, against adult mosquitoes, and against larvae, the last of which contains also a consideration of methods adapted to special circumstances. An appendix, which the author rightly considers an important feature of the book, is the bibliography of 570 references arranged according to the measures considered. The literature of the world has been drawn upon, and it is hard to detect any omissions. The appendix includes anti-mosquito apparatus, oils, poisons, etc., with addresses of high class firms in various parts of the world from which these materials may be bought. The prices are given in Indian money, which will not be of much assistance to readers in other countries.

The book is well arranged, well written, and adequately illustrated. It is decidedly useful and deserves a wide circulation. MAZŸCK P. RAVENEL

Health and Social Evolution. *Halley Stewart Lecture, 1930—By Sir George Newman, M.D. London: George Allen & Unwin, Ltd.*, 1931. 200 pp. Price, $1.75.

In discursive and easily readable style the author traces the history of the Public Health Service in England. The story, he claims, is social rather than medical; that is, the "progress of the art of medicine is dependent upon the social evolution of the people."

While the book is a sketch rather than a treatise, there is brought home to the American reader strongly, even though implicitly, the escape of the English public health program from bureaucracy, in our subversive American sense, as well as the fact of significant accomplishment. They have attained community of purpose and effort without sacrifice of the individual and of individual choice and initiative.

The public health program is only part of a vaster social program which, taken in its entirety, does not show unalloyed gains nor complete successes in all detail, and some critical estimate of the gains and losses, both observed and potential, is indulged in as a concluding chapter.

Sir George Newman is one of the

most interesting writers on health matters we have today. He has given us a book that can be recommended to all for information as well as entertainment. ALLEN E. STEARN

The Control of Tuberculosis in the United States—*By Philip P. Jacobs, Ph.D. New York: National Tuberculosis Association*, 1932. 416 pp. Price, $2.00.

Within the last 30 years what other single disease in the United States has produced as much as tuberculosis in tons of literature, sums of money, number of hospital beds, full-time workers or organizations? In view of the importance of the subject and its many ramifications, it is a most difficult task indeed for anyone to acquire sufficient experience and perspective to qualify him to tell the story of the control of tuberculosis in the United States. Yet this is what the author has succeeded in doing.

Against a brief European background, the author very carefully traces the origin of the antituberculosis campaign in the United States. He describes the significant contributions made by pioneer leaders and organizations including the National Tuberculosis Association which was founded in 1904. Fanwise, both horizontally and perpendicularly, the movement has spread to permeate the entire social order with its influence. In 1931 there were in the United States, 1,471 tuberculosis associations and committees, duly organized and constituted for that purpose.

Due recognition is given to concomitant forces other than the organized antituberculosis campaigns which have been factors in the actual decrease of the incidence of tuberculosis in this country. Health workers in fields other than tuberculosis are often prone to forget the helpful influence of this strongly organized antituberculosis movement because it has come to be so much taken for granted that tuberculosis is decreasing where there is no organized movement against it. The debate is not at that point. The question is, how much faster has been the decline because of organized efforts against its inroads.

Very illuminating is the author's presentation of the Christmas Seal sale, its origin, its development to where its returns in 1930 were 5½ million dollars. The author shows intimate knowledge of the development of the Community Chest movement in the United States to the point where now 300 communities are so organized. He discusses the relationship between the Christmas Seal sale and the Community Chest movement.

The book is divided into 4 parts. There are 4 chapters on the historical aspects of the antituberculosis movement. There are 17 chapters on the methods and programs in the control of tuberculosis in the United States. Four chapters are devoted to the fundamental policies of the tuberculosis movement in the United States, and 6 chapters to illustrative programs. There is a list of selected references at the end of each chapter. The author has screened the literature and gives a list of books for the tuberculosis secretary. There are lists also for the nurse, for the physician, and for the tuberculosis patient. The appendix closes with a list of periodicals for those interested in the subject of tuberculosis. Finally there is a good index.

During the 24 years devoted to tuberculosis work, Dr. Jacobs has written a great deal. This concise and comprehensive contribution will probably rank as his most important. This book should be in every public and professional library, particularly in medical and nursing schools. Many physicians, many nurses and most public health and social workers will find it invaluable in the professional health field. This book should be classed as one of the books of the year. W. W. PETER

Medical Supervision and Service in Industry. *Compiled and published in 1931 by the National Industrial Conference Board, Inc., 247 Park Avenue, New York.* 125 pp. Price, $2.00.

This is a revision of two previous studies published by the National Industrial Conference Board, and has the advantage of comparing statistics previously compiled with important new material.

A special feature of the study is the inclusion of 53 per cent of the companies employing less than 1,000 employees.

As the monograph states,

> A gradual shifting of emphasis from the curative phases of medical care to preventive work and health education is evident. With this development have come corresponding changes in the personnel and equipment of medical departments and in the average cost per employee. Aside from the sociological benefits resulting from the improved medical care of the employees, there has been a reduction of compensation costs and of waste involved in excessive labor turnover, absenteeism, and low labor efficiency.

The chapter headings indicate fairly well the scope of this publication: "The Place of the Medical Department in Industry," "Staff and Equipment," "Physical Examination of Employees," "Industrial Accidents and Their Treatment," "Diagnosis, Treatment, and Prevention of Illness," "Medical Work in the Small Plant," "Medical Records," "Analysis of Work of Medical Department," "Cost of Medical Supervision and Service," "The Value of Medical Work in Industry."

A valuable addition is the appendix, which includes routine and standardized procedures in physical examinations, first aid treatment, a standardized medical terminology, and last but not least the estimated value of medical service in a company of 500 employees.

This is a valuable reference work for all who have to do with industrial health and safety in any of its aspects.

C. O. SAPPINGTON

Ronald Ross. Discoverer and Creator—*By R. L. Megroz. London: George Allen & Unwin, Ltd.*, 1931. 282 pp. Price, $3.75.

There is no medical man living whose life, history, personality, and accomplishments are more interesting than the subject of this work. He is well described as "a many sided genius," but is best known to the world for his demonstration that the Anopheles mosquito is the carrier of the malarial parasite. Over this question has raged an unfortunate controversy. The reviewer believes that the evidence supports the claims of Ross. This was evidently also the belief of those in charge of the Nobel Prize in Medicine, which was given to him in 1902. The verses written on the day of his discovery, amended and sent to his wife the next day, have always seemed conclusive evidence of this stand.

The book before us consists of practically two parts: one devoted to Ross's history and scientific work, the other to his literary accomplishments. Few people realize that, in addition to being a bacteriologist and naturalist of a very high order, he is also a poet, novelist, and mathematician. An introduction to the volume by Osbert Sitwell gives high praise to his literary ability; yet the public knows little about this side of the man.

The first part of the book is not only a history of Ross, but of necessity gives also the story of malaria, and enables one to realize what Ross's discovery has done for the world, showing how justly he estimated his discovery in the verse, "I know this little thing a myriad men will save." The volume closes with several appendixes, the first of which might well have been omitted, as it is Ross's answer to the claims of Grassi,

not written in the best temper. The others are bibliographies of his scientific publications, those on mathematics and literature, and finally a list of his awards and honors.

The book is well written. Every page holds the reader, even though he may not be a scientist and acquainted with Ross's accomplishments. A peculiar pathos attaches to the book, appearing at a time when Sir Ronald is in dire straits financially, after a life devoted to the welfare of the public and crowned with success recognized throughout the world. It tells of his grinding work, heart burning disappointments, due to orders from those in authority—for he was an army man—coming at the moment when success seemed imminent; of the claims of others which would have deprived him of the credit so richly deserved.

The author is frankly a hero worshipper when it comes to the subject of his work.

We commend this book to the public and even to those physicians and bacteriologists who have read Ross's *Memoirs*. We trust that it will bring to England a realization of the claims of one of her foremost scientific sons who we believe has not received the recognition due. MAZŸCK P. RAVENEL

A System of Bacteriology in Relation to Medicine. *Vol. IX. London: His Majesty's Stationery Office*, 1931. Price, $6.00.

This is Volume IX of the System of Bacteriology in Relation to Medicine published under the auspices of the Medical Research Council of England. It is devoted to technical methods, and includes the general index. The authors do not pretend to give all of the useful methods of doing bacteriological examinations, but describe one or more for each procedure which they have found adequate for their own needs. It is unfortunate that they have not seen fit to include more of the well known American and continental European procedures. In this country, the direct titration of mediums to a desired pH by the use of bromthymol blue has almost entirely replaced the indirect methods in which thymolphthalein or phenolphthalein is used.

To one trained in immunology, it is not entirely clear how the results of the Wassermann test, described on page 208, can be read, "when some of the tubes are quite laked and others are quite opaque," especially in a series of negative tests.

In addition to chapters treating of the usual bacteriological methods, there are others which give details of technic not so well known to many bacteriologists as: isolation of single bacterial cells; filtration; methods of studying filtrable viruses, including their cultivation, preservation, and the demonstration of cell inclusions; the measurement of oxidation-reduction potentials; the determination of electric charge; and the production and isolation of bacterial variants. The chapter on Production of Variants is especially interesting. Of great practical value are the directions for breeding, maintenance, and handling of laboratory animals.

This volume is a fitting ending for the most valuable series which has preceded it. It shows the study and discriminating judgment which characterize all other volumes of the series. The printing and make-up of the book are exceptionally good. Bacteriologists the world over are under a debt of gratitude to the Medical Research Council as well as to the individuals who have done the actual work in the production of these volumes. NEWELL R. ZIEGLER

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

Canadian Opinion on Maternal Mortality—This summary of the various answers to a questionnaire on the causes and prevention of maternal mortality reveals only that there is little difference in the number and variety of opinions on this subject north and south of the international line.

BROWN, J. N. E. Observations and Opinions on Material Mortality. Canada Lancet, 78, 4: 108 (Apr.), 1932.

Pneumonia Type II—In a study of 1,000 cases with a mortality rate twice that of type I, Felton's serum was found beneficial, though not strikingly so.

CECIL, R. L., AND PLUMMER, N. Pneumococcus Type II Pneumonia. J. A. M. A., 98, 10: 780 (Mar. 5), 1932.

Longevity in Mental Deficiency—If one wishes to know how long idiots, imbeciles and morons live, what their expectancy is in relation to total population, and of what they die, this paper will prove a gold mine of information.

DAYTON, N. A., *et al.* Mortality and Expectation of Life in Mental Deficiency in Massachusetts: Analysis of the Fourteen-Year Period 1917–1930. New Eng. J. Med., 206, 11: 555 (Mar. 17), 1932.

The Dangers of Childbirth—The terrified expectant mother who reads this "penny dreadful" will decide that she might as well be taken out behind the barn and shot as to brave the dangers of modern obstetrics. A good example of a popular article with considerable factual basis which produces a thoroughly undesirable and unwarranted end picture.

DEKRUIF, P. Savers of Mothers. Ladies Home J., Mar., 1932, p. 6.

New York Health Centers—The importance and value of statistics in health center planning is excellently illustrated in the discussion of the problem of providing local health services to a group of 7 million people living in an area of more than 300 square miles with a population density varying from 2,000 to 84,000 per square mile.

DROLET, G. J., AND WEINER, L. Vital Statistics in the Development of Neighborhood Health Centers in New York City. J. Prev. Med., 6, 1: 59 (Jan.), 1932.

Pollution of Water Supplies—Numerous examples of the way pollution has entered presumably safe deep-well water supplies are presented in graphic detail.

EASTWOOD, C. H. Pollution Hazards. Water Works Eng., 85, 5: 248 (Mar. 9), 1932.

Typhoid Fever Vaccination—Persons who have had typhoid fever or prophylactic treatment produce more antibodies in response to subsequent inoculations than do those who have not; the ordinary routine treatment may not produce as much immunity as we have believed; and the severity of the reaction bears no relation to the immunity produced.

FEEMSTER, R. F. The Effect of Typhoid Fever and of Previous Typhoid Vaccination on the Antibody Response to Inoculation with Typhoid Vaccine. J. Infect. Dis., 50, 2: 120 (Feb.), 1932.

Dust Sampling—The impinger dust sampler is described in detail and its use explained. It is of value not only in the collection of dust particles, but for certain fumes as well.

GREENBURG, L., AND BLOOMFIELD, J. J. The Impinger Dust Sampling Apparatus as Used by the U. S. Public Health Service. Pub. Health Rep., 47, 12: 654 (Mar. 18), 1932.

Organized Health Propaganda in England—What the Central Council for Health Education proposes to do in

its advisory capacity concludes a stimulating discussion of the whole field of influencing health behavior.

KENWOOD, H. R. The Health Education of the Citizen. J. State Med., 40, 3: 126 (Mar.), 1932.

Convalescent Serum in Poliomyelitis—"We failed to obtain statistical evidence that convalescent serum is effective. However, it is not possible to draw the reverse conclusion; namely, that serum is of no value." The authors feel that the study reported justifies its use on a larger scale.

KRAMER, S. D., *et al.* Convalescent Serum Therapy in Preparalytic Poliomyelitis. New Eng. J. Med., 206, 9: 432 (Mar. 3), 1932.

Climate and Health and Fecundity—Argument: if storms stimulate metabolism, then goiter, anemia, diabetes, and mental diseases should be overstimulated. Sure enough, proportionate deaths from these conditions are greater in the "storm country" than in the south. You draw your own conclusions about whither we are drifting. The same storms stimulate female fecundity, concludes the author upon statistical evidence which seems a bit thin.

MILLS, C. A. Climate as a Factor in the Health of Man, and Geographic Variations in Female Sex Functions. Am. J. Hyg., 15, 2: 573 (Mar.), 1932.

BCG Vaccination Again—The reasons why the author considers BCG unsafe are set forth. He includes the Lubeck disaster, offering it as evidence of reversion, because in his opinion contamination with human tuberculosis did not take place. Since his paper was written the trial findings have been published and the principals are convicted of negligence in permitting the possibility of just such contamination.

PETROFF, S. A. The Present Status of BCG Vaccination. New Eng. J. Med., 206, 9: 436 (Mar. 3), 1932.

Venereal Disease Trends—Two state-wide surveys of venereal disease incidence in 1927 and 1930 produced some interesting findings. The crude statistics indicate no change in the trend of gonorrhea and a slight increase in syphilis. Only 20 per cent of the physicians thought the diseases were increasing, and they believed this to be caused by moral laxity, prohibition, better diagnosis, ignorance, and uncontrolled prostitution. Those who thought the diseases to be decreasing gave as the reasons education, prophylaxis, better treatment, and clinics.

PFEIFFER, A., AND CUMMINGS, H. W. Syphilis and Gonorrhea in Up-state New York. Am. J. Hyg., 15, 2: 459 (Mar.), 1932.

Dissociation and the Staphylococcus—*Staphylococcus albus, citreus* and *roseus* may be split off from *S. aureus*, and *aureus* in turn may be recovered again from *albus*. The authors find the *aureus* and *albus* strains essentially similar to S and R strains in other bacteria. Thus is another prop pulled out from under our shaky temple of bacteriological beliefs.

PINNER, M., AND VOLDRICH, M. Derivation of Staphylococcus Albus, Citreus and Roseus from Staphylococcus Aureus. J. Infect. Dis., 50, 3: 185 (Mar.), 1932.

Gas Appliance Ordinance—Both the provisions of the Baltimore gas appliance ordinance and the problems concerned in its enforcement are discussed in detail.

SCHULTZE, W. H. The Baltimore Gas Appliance Ordinance and Its Relationship to Public Health. J. Indust. Hyg., 14, 2: 41 (Feb.), 1932.

Hemolytic Streptococci in Milk—The term "*St. epidemicus*" cannot be used to designate the causative agent for septic sore throat, say these authors. Milk-borne sore throat and scarlet fever may be caused by one of several types of hemolytic streptococci.

WILLIAMS, A. W., *et al.* Milk-Borne Septic Sore Throat and Scarlet Fever and Their Relation to Beta Hemolytic Streptococci. J. Bact., 23, 3: 241 (Mar.), 1932.

More About Russia—Among the very few unprejudiced glimpses we get into the Russian scene, this will be particularly interesting to health workers, for it has to do with social problems nearest to them.

WILLIAMS, F. E. Russia—A Nation of Adolescents. Survey Graphic, 46, 1: 9 (Apr. 1), 1932.

Getting the Most Out of Health Examinations—The school health examination becomes an educational experience when all the possibilities are realized in anticipation, preparation, examination and follow-up.

WILSON, C. C. Making the Health Examination an Educational Experience. J. Health & Phys. Ed., 3, 3: 8 (Mar.), 1932.

Communicable Disease Fatality Rates—Case-fatality ratios less than these indicate incomplete reporting: diphtheria 15 to 19 cases to 1 death; measles 500 to 1; scarlet fever 100 to 1; typhoid fever 8 to 12 to 1; whooping cough 125 to 150 to 1. This is the conclusion of a Pennsylvania study.

WOOD, H. B. Case Fatality of Communicable Disease. J. Prev. Med., 6, 2: 87 (Mar.), 1932.

BOOKS RECEIVED

THE MODERN AMERICAN FAMILY. Edited by Donald Young. Philadelphia: American Academy of Political and Social Science, 1932. 253 pp. Price, $2.50.

THE RHEUMATIC INFECTION IN CHILDHOOD. By Leonard Findlay. New York: Wood, 1932. 187 pp. Price, $3.50.

MAN AND MICROBES. By Stanhope Bayne-Jones. Baltimore: Williams & Wilkins, 1932. 128 pp. Price, $1.00.

MRS. ABRAHAM LINCOLN. By W. A. Evans. New York: Knopf, 1932. 364 pp. Price, $4.00.

THE SEXUAL SIDE OF MARRIAGE. By M. J. Exner. New York: Norton, 1932. 252 pp. Price, $2.50.

TEXTBOOK OF HUMAN PHYSIOLOGY. August Krogh. Philadelphia: Lea & Febiger, 1932. 233 pp. Price, $2.75.

THE AETIOLOGY OF TUBERCULOSIS By Dr. Robert Koch, translated by Dr. and Mrs. Max Pinner. New York: National Tuberculosis Association, 1932. 48 pp. Price, $.50.

PLAN AND TECHNIQUE OF DEVELOPING A PRISON INTO A SOCIALIZED COMMUNITY. By J. L. Moreno. New York: National Committee on Prisons and Prison Labor, 1932. 67 pp. Free.

NEW YORK SCHOOL CENTERS AND THEIR COMMUNITY POLICY. By Clarence Arthur Perry and Marguerita P. Williams. New York: Russell Sage Foundation, 1931. 78 pp. Price, $.50.

THE JUDD FAMILY. A Story of Cleanliness in Three Centuries. By Alice Mary Kimball and Mary Alden Hopkins. New York: Cleanliness Institute, 1931.

PRINCIPLES AND PRACTICES IN PUBLIC HEALTH NURSING INCLUDING COST ANALYSIS. Prepared by the National Organization for Public Health Nursing, Inc. New York: Macmillan, 1932. 129 pp. Price, 1.75.

AMERICAN SOCIETY OF MUNICIPAL ENGINEERS. Official Proceedings of the Thirty-Seventh Annual Convention, October 19–23, 1931. Vol. 37. St. Louis: American Society of Municipal Engineers, 1932. 855 pp. Price, $7.50.

NEWS FROM THE FIELD

SUMMER SCHOOL COURSES IN PUBLIC HEALTH

While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.

University of California, Berkeley, Calif.

June 23–August 3

Administration of Schools of Nursing
Elementary Epidemiology
Elementary Public Health
Public Health Nurse in Relation to the Community
Responsibility of the Public Health Nurse for the Health of the Adult
Elementary Supervision in Schools of Nursing
Advanced Supervision in Schools of Nursing
Biometry

University of Chicago, Chicago, Ill.

June 20–August 26
First Term: June 20–July 22
Second Term: July 25–August 26

Teaching the Principles and Practices of Nursing
Supervision in Schools of Nursing
Field of Public Health Nursing
General Bacteriology
Advanced Bacteriology, Parasitology, and Public Health
Special Public Health Problems
Preventive Medicine and Immunology
Introduction to Nutrition and Dietaries
Nutrition and Diet in Disease
Clinical Nutrition
Readings in Nutrition
Child Care
Child Development and Training
Nutrition Work with Children
Principles and Problems of Human Nutrition and Dietetics

Columbia University—DeLamar Institute of Public Health, College of Physicians and Surgeons, New York, N. Y.

June 13–July 1

School Health Supervision—Medical Inspection, Mental Hygiene, and Physical Education

Teachers College, New York, N. Y.

July 5–August 12

Administration of Health Work in Schools
Child Hygiene
Health Care of Infants
Health Education in Elementary Schools
Health Problems in the Teaching of Fresh Air Classes
Home and Community Hygiene
Industrial Hygiene
Methods of Teaching Lip-Reading
Nutrition and Health
Personal Hygiene
Principles of Health Administration
Principles of Public Health Nursing
Public Health Administration
Research in Child Health
Safety Education
School Nursing
Sight Saving Classes
Supervision in Public Health Nursing
Supervision of Health Education
Survey of Public Health Nursing

Cornell University, Ithaca, N. Y.

July 11–August 19

Gymnastics and Dancing
Health Supervision of School Children
Hygiene of the School Child and Adolescent
Measurements of School Children
Physical Education

Duke University, Durham, N. C.

June 14–July 22

Materials and Methods in Health Education
Materials and Methods of Physical Education

University of Georgia, Athens, Ga.

June 13–August 13

Behavior Problems in Children
Child Care and Training
Child Development
Child Study and Parent Education
Development of the Young Child
Diagnosis and Treatment of Exceptional Children
Educational Biology
Educational and Mental Hygiene
Educational Hygiene
Educational Sociology
Health Education
Mental and Educational Measurements
Physiology and Health
Play Activities
P. T. A. and Parent Education
Principles of Health and Recreation
Mental Hygiene
The Age of Adolescence
The Age of Childhood

Harvard University, Cambridge, Mass.

July 6–August 16

Principles and Problems of Hygiene, and Teaching Methods
Physical Education, Theory and Practice

University of Hawaii, Honolulu, T. H.

July, 1932

Public Health Nursing
Child Hygiene
Nutrition
Public Health Administration

University of Illinois, Urbana, Ill.

June 20–August 13

Physical Education
School Program of Physical Education
Training Theory
Health Education and Corrective Gymnastics
Organization and Administration of Program in Physical Education for Elementary Schools

Johns Hopkins University, Baltimore, Md.

June 27–August 6

Elements of Hygiene and Preventive Medicine
Child Health Problems

Massachusetts Institute of Technology, Cambridge, Mass.

July 5–August 12

Bacteriology

Michigan State College, East Lansing, Mich.

June 20–July 29

Bacteriology
Hygiene
Medical Biology
Pathology
Physiology

University of Michigan, Ann Arbor, Mich.

June 24–July 30

Child Welfare
International and National Health Problems
State Health Work
Municipal Health Problems
Descriptive Vital Statistics
Advancements in Our Knowledge of Nutrition
School Health Program
Organization and Administration of Community Social Work
County Health Work
Control of Communicable Diseases
The Rôle of the Laboratory in Public Health Work
Principles and Practices of Epidemiology
Methods and Materials in Health Education
Dental Hygiene
Mental Hygiene

University of Minnesota, Minneapolis, Minn.

June 13–August 27

Public Health

University of Missouri, Columbia, Mo.

June 13–August 5

Nursing
Physical Education
School Hygiene

University of New Mexico, Albuquerque, N. M.

June 6–July 30

Educational Hygiene

New York University, New York, N. Y.

July 7–August 17

Child Hygiene
Education in Health
Health and Growth of School Children
Methods of Teaching Health
Principles of Teaching Health

Northwestern University, Evanston, Ill.

June 20–August 13

Personal Hygiene

University of Pennsylvania, Philadelphia, Pa.

July 5–August 13

Hygiene
Physical Education

Rutgers University, New Brunswick, N. J.

June 27–August 5

First Aid
Preventive Medicine
Public Health

Stanford University, Stanford University, Calif.

June 23–September 3

Health Department Administration
Physical Education and Hygiene
Public Health Nursing

Syracuse University, Syracuse, N. Y.

July 5–August 16

Public Health Nursing
Methods in Teaching Home Hygiene Courses
Hygiene

University of Virginia, University, Va.

June 20–July 30 (First Term)
August 1–September 3 (Second Term)

Biochemistry
Hygiene and Sanitation
Physical Education
Sex Character Education

Vassar College, Poughkeepsie, N. Y.

July 29–August 10

Child Psychology
Course for Nursery School Teachers
Mental Hygiene
Physiology and Nutrition
Recreation
Household Technology
Food Selection, Preparation, and Service
Problems of the Modern Family
Parent Education Leadership

University of Washington, Seattle, Wash.

June 15–July 22 (First Term)
July 25–August 25 (Second Term)

Advanced Nutrition
Bacteriology
Health Education Movement
Physical Education Methods
Principles of Physical Education
Administration of Public Health Nursing
School Hygiene
Supervision of Physical Education
Principles in Health Education
Foundations and Practices of Physical Education
Euthenics in Mental Health

University of West Virginia, Morgantown, W. Va.

June 13–July 22

Public School Health

Western Reserve University, Cleveland, O.

June 20–July 29

Foods and Health
Hygiene of the Child
Personal Hygiene
Public Health Nursing
Methods in Health Education
Nursing Education to prepare graduate nurses for head nursing, administration, teaching, etc., in schools of nursing

University of Wisconsin, Madison, Wis.

June 27–August 5

Bacteriology
First Aid to the Injured
Supervision and Administration of School Health
Tests and Measurements in Physical Education
Health Education in Schools

EDUCATION ASSOCIATIONS HEALTH SECTION TO MEET IN HONOLULU

THE Health Section Meetings of the Pacific Regional Conference of World Federation of Education Associations will be held in Honolulu, July 25–30, 1932. C. E. Turner, Dr.P.H., of the Massachusetts Institute of Technology, is Chairman. Subjects to be discussed include: Nutritional Needs in Relation to Racial and Climatic Conditions, The Health Examination of School Children, Play Activities in Relation to Health, and Health Training for Teachers. Summer courses in Health and Education will be given at the University of Hawaii in July.

This is an opportunity for participation in an international professional meeting, and for an ideal summer vacation. Special travel rates will be available. For further information write to the Secretary, Sally Lucas Jean, 200 Fifth Avenue, New York, N. Y.

SOUTHERN CALIFORNIA ASSSOCIATION ELECTS OFFICERS

THE following officers were elected at the recent meeting of the Southern California Public Health Association: President, Wilson G. Knowlton; President-Elect, Dr. W. B. Wells; First Vice-President, Dr. Charles W. Decker; Second Vice-President, Dr. George H. Roth; Secretary-Treasurer, F. D. Sweger.

INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS

FRED RASMUSSEN, of Harrisburg, Pa., Executive Secretary of the International Association of Ice Cream Manufacturers for the last 7 years, died on February 21. He was 56 years of age, and a native of Denmark, but in 1912 he became a citizen of the United States. Mr. Rasmussen was Pennsylvania State Secretary of Agriculture 1919–1923.

During the War he had charge of work in connection with animal husbandry for the U. S. Food Administration in Pennsylvania and served later in the American Red Cross in France.

Robert C. Hibben, who has been with the Association as head of the Bureau of Service and Statistics for the past 6½ years, has been appointed Acting Executive Secretary.

SCHOOL LIFE IN PORTO RICO

MEALS at 1 cent each, payable in produce when cash is not available, are served every day to 50,000 children in the schools of Porto Rico. The meals are prepared and served by girl pupils as part of their school training.

Theodore Roosevelt, in his last written review of education in Porto Rico, before his recent appointment by President Hoover to the governorship of the Philippine Islands, cites this as one of the many methods used in Porto Rico to "disseminate practical knowledge." —*School Life*, official organ of the Office of Education, U. S. Dept. of the Interior.

50,000 SCHOLARSHIPS IN UNITED STATES

INFORMATION regarding scholarships and fellowships available at institutions of higher learning in the United States, which is of vital interest to many thousands of students who need financial assistance to enable them to complete their education, is contained in a new bulletin of the Federal Office of Education, 1931, No. 15, price 30 cents, available from the Superintendent of Documents. The publication, prepared by Ella B. Ratcliffe, chief educational assistant in the division of colleges and professional schools, lists the scholarship offerings at 402 colleges and universities. More than 50,000 scholarships and fellowships are available annually in the United States, it is estimated. The total money value of the grants is approximately $10,000,000.

THE LUEBECK DISASTER

IN our issue of March, 1932, we gave the decision of the court concerning the Luebeck disaster finding that Drs. Deycke and Alstaedt were guilty of homicide and sentenced to prison, one for 2 years and the other for 15 months. Most recent reports say that the case has been appealed. The result will be awaited with interest. The sympathy of everyone goes out to Dr. Deycke and his assistants, and we cannot help hoping that some amelioration may be granted on their appeal.

PERSONALS

DR. JOHN B. DERRICKSON, of Frederica, Del., has been appointed director of the Sussex County Health Unit, with headquarters at Georgetown, Del.

DR. HYMAN I. SPECTOR, member A. P. H. A., of St. Louis, Mo., who resigned 6 years ago as tuberculosis controller for the city, has been reappointed to that position, to succeed the late Dr. Howard H. Bell.

DR. ROBERT R. ELLIS, of Kirksville, Mo., has been appointed deputy state Health Commissioner for a term of 3 years.

DR. JACOB L. MORENO has been appointed Consultant in Psychiatry and Criminology by the Board of Directors of the National Committee on Prisons and Prison Labor.

DR. JUNIUS B. HARRIS, of Sacramento, Calif., and Gifford L. Sobey, of Paso Robles, Calif., were recently appointed members of the California Department of Public Health, to succeed Drs. Robert A. Peers and Fred F. Gundrum, whose terms expired.

DR. FINIS C. SUGGETT, member A. P. H. A., of Columbia, Mo., is the new director of the Des Moines, Ia., County Health Unit. He succeeds Dr. Carl F. Jordan, who is returning to the University of Iowa as assistant professor of hygiene and preventive medicine.

CONFERENCES

May 9–10, American Association of Medical Milk Commissions, and the Certified Milk Producers' Association of America, New Orleans, La.

May 14, Texas Beach and Pool Association, Fourth Annual Short School, Dallas, Tex.

May 10–15, Annual Congress of The Royal Institute of Public Health, Belfast, Ireland.

May 12–13, Annual Pennsylvania Statewide Safety Conference, Harrisburg, Pa.

May 15–21, National Conference of Social Work, Philadelphia, Pa.

May 20–21, National Advisory Health Council of the National Institute of Health, Washington, D. C.

May 25–27, The Canadian Public Health Association, 21st Annual Meeting, in association with Ontario Health Officers' Association, Toronto, Ont.

June 2–3, State and Provincial Health Authorities of North America, Washington, D. C.

June 2–3, State and Territorial Health Officers Conference, Washington, D. C.

June 6–9, National Tuberculosis Association, Colorado Springs, Colo.

June 9–11, Third Annual Meeting, Western Branch, American Public Health Association, Denver, Colo.

July 9–16, Royal Sanitary Institute, Brighton, England.

July 21–29, 100th Anniversary Meeting, British Medical Association, London.

July 25–30, Regional Conference of the World Federation of Education Associations, Honolulu, Hawaii.

July, 1932, The Second International Conference of Social Work, Frankfurt.

October 24–27, 61st Annual Meeting, American Public Health Association, Washington, D. C.